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WILLOWS OF MONTANA



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U.S. Forest Service Technical Bulletin No. 2
September 1992

U.S. Department of the Interior
Bureau of Land Management
Montana State Office
Billings, Montana





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Montana State Office

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IN REPLY TO:

6840 (931)

November 23, 1992

Dear Colleague:

Enclosed is a copy of the Third Approximation of "Willows of Montana." Please take note of the errata sheet. I intend to bring out the final product in the fall of 1993. Please utilize the book in the spring and summer of 1993 and submit your criticisms to me at:

Don Heinze
BLM Montana State Office
P.O. Box 36800
Billings, MT 59107

I will incorporate the necessary changes into the final product and also have the line drawings improved.

Sincerely,

Donald H. Heinze
Botanist

1 Enclosure

1-"Willows of Montana"

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ERRATA

Page 5, last sentence, capitalize Avens and Cinquefoil.

Page 8-9, Maps are reversed.

Page 29, Drawings courtesy of University of Washington Press and New York Botanical Garden.

Page 31, Drawing courtesy of New York Botanical Garden.

Page 32, Drawing courtesy of University of Washington Press.

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Page 56, Also found in Bighorn County.

Page 66, Drawing courtesy of University of Washington Press.

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Montana Willows
(A Third Approximation)
Riparian Technical Bulletin No. 2

1992

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Acknowledgments

The help and support for this project from the Montana/Wyoming Botanical Community has been very gratifying. Special acknowledgment must go to Robert Dorn, Mountain West Environmental Services; and Peter Lesica, Lesica Ecological Services. They epitomize the concept of gentlemen and scholars. Other people who were instrumental in making the project possible are Steve Chadde, U.S. Forest Service; Robert Allen, artist, BLM; Janie Fox, typist, BLM; Mary Lou Mayes, cartographic technician, BLM; Paul Hansen, Montana Riparian Association; Sandy Brooks, range conservationist, BLM; and John Moorhouse, Chief, Branch of Biological Resources, BLM.

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Introduction

Willows, the genus *Salix*, are intimidating. The genus is very large, complex, and variable, which makes determining species extremely difficult under most circumstances. We, however, have entered an era of sophisticated riparian management where it is no longer permissible to write "*Salix* sp." and go on whenever a willow is encountered. The purpose of this technical bulletin is to aid the field person in making expedient, accurate identification of species of the genus. It is assumed that the user of the bulletin has had at least one college course in plant taxonomy; we do not recommend that others attempt to use it.

We have identified several problems regarding identification of willow species and have attempted to solve them. These are:

1. Problem: The size of the genus. Dorn (1984) lists 34 species (33 of which are native) that may occur naturally in the state. In addition, there are three more exotic species which *may* escape or otherwise may have riparian significance.

Offered Solution: We have divided Montana into five ecological zones: Plains, Foothills/Valley, Montane, Subalpine, and Alpine (see map). Descriptions of these zones follow this introduction. With his permission, we have then divided Robert Dorn's Willow Key (1984) into five parts, one for each of the five ecological zones. Therefore, someone working on the plains will not have to deal with plants that are found in the mountains; he/she can go directly to the pertinent key.

2. Problem: Overlap. A given species may occur in two or more ecological zones.

Offered Solution: We have placed species which occur in several zones into several keys; i.e., the zones pertinent to that species. This does tend to reduce the effectiveness of dividing the species into zones, but still all zone keys are at least 50 percent smaller than the original key (17 species v. 37 in the case of the largest zone key).

3. Problem: Size of narrative. Most works on willows are, of necessity, very extensive.

Offered Solution: Put text in tabular form. This also makes the descriptions of various structures (leaves, twigs, etc.) easier to find. Delete as much syntax as possible. If someone wants to know more about a given species, he/she can go to the suggested references. To save space in the tables, we have made shorthand designations for these references; e.g., "ECI" refers to "Willows of East Central Idaho, by Brunsfeld and Johnson, 1985.

4. Problem: Terminology. A large amount of Latin is necessary to describe the structures of the plants. Glossaries are often cumbersome and sometimes do not adequately communicate the correct meaning to the reader.

Offered Solution: Make a clear, concise, illustrated glossary especially for willows.

5. Problem: Variation in terminology. One piece of work will refer to a structure as a scale, another will call it a floral bract. There are many other examples of this: catkin v. ament, coetaneous v. "appearing at the same time as the leaves," etc.

Offered Solution: Include the interchangeable terms in the glossary and use clarification of these terms when necessary.

6. Problem: Written descriptions are often difficult to picture in one's mind.

Offered Solution: Illustrate every species with a line drawing (which is usually better than a photograph for identification purposes). However, one should *not* rely upon pictures alone when deciding on the final identification of a species.

7. Problem: Nomenclature variations. Many specific names are now in synonymy; i.e., *S. rigida* Muhl., *S. glaucops* Andress. A single species may have as many as five common names.

Offered Solutions:

- a. Establish a final authority regarding nomenclature.
- b. Pay close attention to synonymy, clarifying what names will no longer be used.
- c. State the most accepted common name for a given species and mention the possible other names that the species might be called.

8. Problem: Capitalization. Capitalization of Latin and common names is inconsistent between works. This may cause confusion. For example, *S. eastwoodiae* is sometimes capitalized *S. Eastwoodiae* after Alice Eastwood (1859-1953), who was, of course, a person. Therefore, Eastwoodiae is a proper noun and should be capitalized.

Likewise, the common name may be capitalized Eastwood Willow, and other times it may be capitalized Eastwood willow. Still at other times neither word is capitalized.

Offered Solution: Establish guidelines. Utilize the most accepted form of capitalization of the Latin name, which is to use a lower case letter in the second name of the binomial: *Salix eastwoodiae*. It should be herein noted that, under botanical rules, it is proper to capitalize Eastwoodiae. This capitalization, however, is not well accepted.

Eastwood Willow may be a common name, but it is still a proper noun. Therefore, we must capitalize both words.

9. Problem: There may be several subspecies, varieties, and/or cultivars of a given willow species.

Offered Solution: Wherever possible, we have not divided species into subspecies, varieties, etc.

10. Problem: Species descriptions often vary from one piece of work to another. For example, one might say "leaves 5 to 9 centimeters long," and another might say "leaves 6 to 10 centimeters long."

Offered Solution: Say "leaves 5 to 10 centimeters long."

11. Problem: Morphological variation (within a species). Dr. Dorn (1970) writes: "No one key can be used to identify all individual willow plants because of their extensive variability."

Offered Solution: Dr. Dorn advises:

- a. "The material to be keyed should have either mature female catkins or mature leaves; catkins are preferable. Abnormal material including "sucker shoots" should be avoided. Several different catkins and different leaves should be checked while keying."
- b. "The area where the plant was found should be surveyed to determine the variability, if any, of the species. Several specimens from the area are better than only one. The area to be surveyed might include a swamp, a mountain top, or a small drainage."
- c. "The material to be keyed should be fresh; the plant should preferably be keyed in the field."
- d. "A hand lens of 10 power or more is desirable for detecting the smaller characteristics."
- e. "The material should be keyed on both flower and vegetative characters when possible. This will serve as a check. Flower characteristics are usually more reliable in case of disagreement."

12. Problem: Ecotypic variation. A species may vary due to the ecological situation that it lives in. For example, *S. arctica*, usually considered a dwarf willow (no more than 8 cm tall), may be larger when it is sheltered. Therefore, it is not always a dwarf and its stature would lead a person away from that part of a key that covers dwarf willows.

Offered Solution: Create a key which warns the field person that a species, in this case *S. arctica*, may have atypical individuals.

13. Problem: Major key criteria can vary among individuals of the same species. For example, *S. drummondiana* may or may not have pruinose twigs.

Offered Solution: Dr. Dorn has made his key in such a manner that one often can reach a given species by taking two or more paths based on morphological features. Thus, *S. drummondiana* appears twice, once at the end of a pathway for plants with pruinose twigs, and the other time at the end of a pathway for plants with non-pruinose twigs.

Other Advice

- a. When you have arrived at a given species, be certain to check all identification criteria in the species description.
- b. Do not try to “force” a given specimen into a species in the key by ignoring one or more identification criteria. For example, if all criteria fit except for the leaf length—say the leaves you have are 13 cm long and a given criterion is 5 to 10 cm, chances are you are trying to call it a species that it is not.
- c. Always carry a copy of Dorn (1984), a 10x hand lens, a metric ruler, and a plant press in the field during the summer. Back these up with a good dissecting scope and floras such as Hitchcock, Et al. (1969) in western Montana and Great Plains Flora Association (1986) in eastern Montana and the Dakotas.

Final Note

This is not the final writing of Montana Willows, it is the third approximation. At this writing, it has not yet been tested in the field. Constructive criticism and comments are both welcome and necessary.

Description of the Ecological Zones

The Ecological Zones are based on Lackschewitz (1986), Kuchler (1964) and Lesica (1991). Four of the zones come from Lackschewitz: Alpine, Subalpine, (including Timberline, Upper Subalpine, and Lower Subalpine), Montane (including Montane Moist and Montane Dry), and Foothills/Valley (called Major Valley by Lackschewitz). We have added Plains to encompass much of central and eastern Montana.

Ecological Zone is determined by a combination of elevation, latitude, aspect, topography, and other factors. Merely giving a range of elevation for a given zone will not suffice because these factors are very interrelated. Therefore, we will herein give the major species of plants that are found in the zones.

The Plains Ecological Zone, according to Lesica (1991), is vegetated by mid-grass grasslands and shrublands dominated by Wyoming Big Sagebrush, Needle and Threadgrass, Western Wheatgrass, Blue Gramma, and Bluebunch Wheatgrass. Riparian areas are dominated by Cottonwood, Green Ash, and Willow. Isolated stands of Ponderosa Pine Woodland occur on fractured bedrock.

The Foothill/Valley Ecological Zone occupies the western valleys and rolling foothills throughout the state. The zone is dominated by Ponderosa Pine savannah and/or bunch grasses such as Bluebunch Wheatgrass and Idaho Fescue. Big Sagebrush dominates drier sites. Savannahs of Limber Pine and Rocky Mountain Juniper are common on slopes in the southwest and south-central regions.

The Montane Zone occurs in the western part of the state and in scattered upland disjuncts in the central part. It is dominated by Douglas-fir and Lodgepole Pine. Cool, more mesic slopes support Englemann Spruce and Subalpine Fir. Species found west of the Continental Divide include Western Larch, Grand Fir, and Western White Pine.

Climax vegetation in the Subalpine Zone is usually a Subalpine Fir and/or Englemann Spruce Forest. Fires have often caused a pyric disclimax forest of Lodgepole Pine. This pine often is in a thick, "dog hair" stand with little understory. Unless there is a fire, however, the climax trees will come in as the pines become senescent.

The Alpine Zone is above the treeline. It is tundra or scree. Dominant plants found here include sedge, bluegrass, Sheep fescue, cinquefoil, and small shrubs as Alpine avens, Shrub cinquefoil, and dwarf willows.

Maps of Ecological Zones



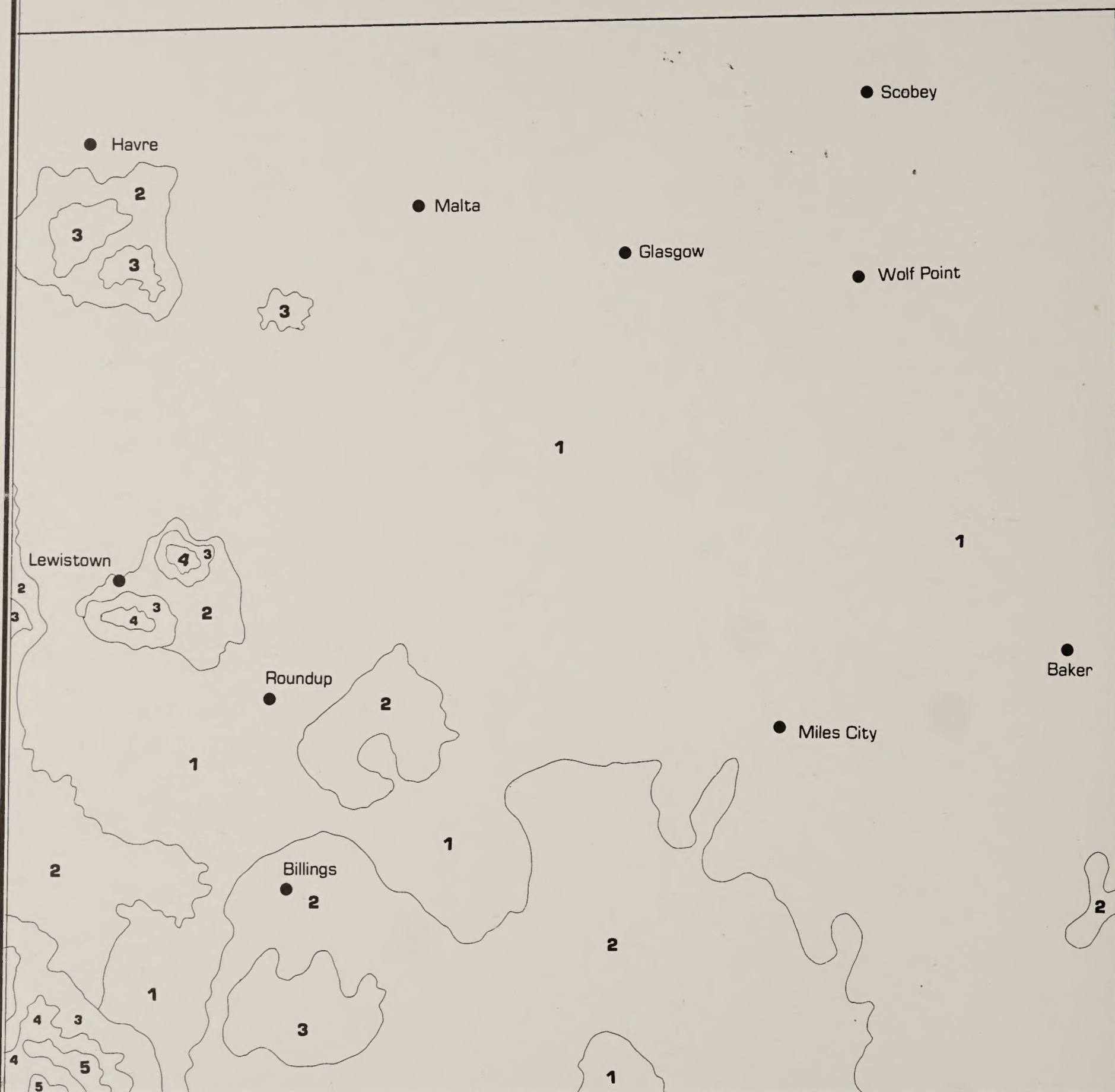
LEGEND

- 1 - Pacific
- 2 - Mountain
- 3 - Great Plains
- 4 - Atlantic
- 5 - Alaska

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- 1 - Pacific
- 2 - Mountain
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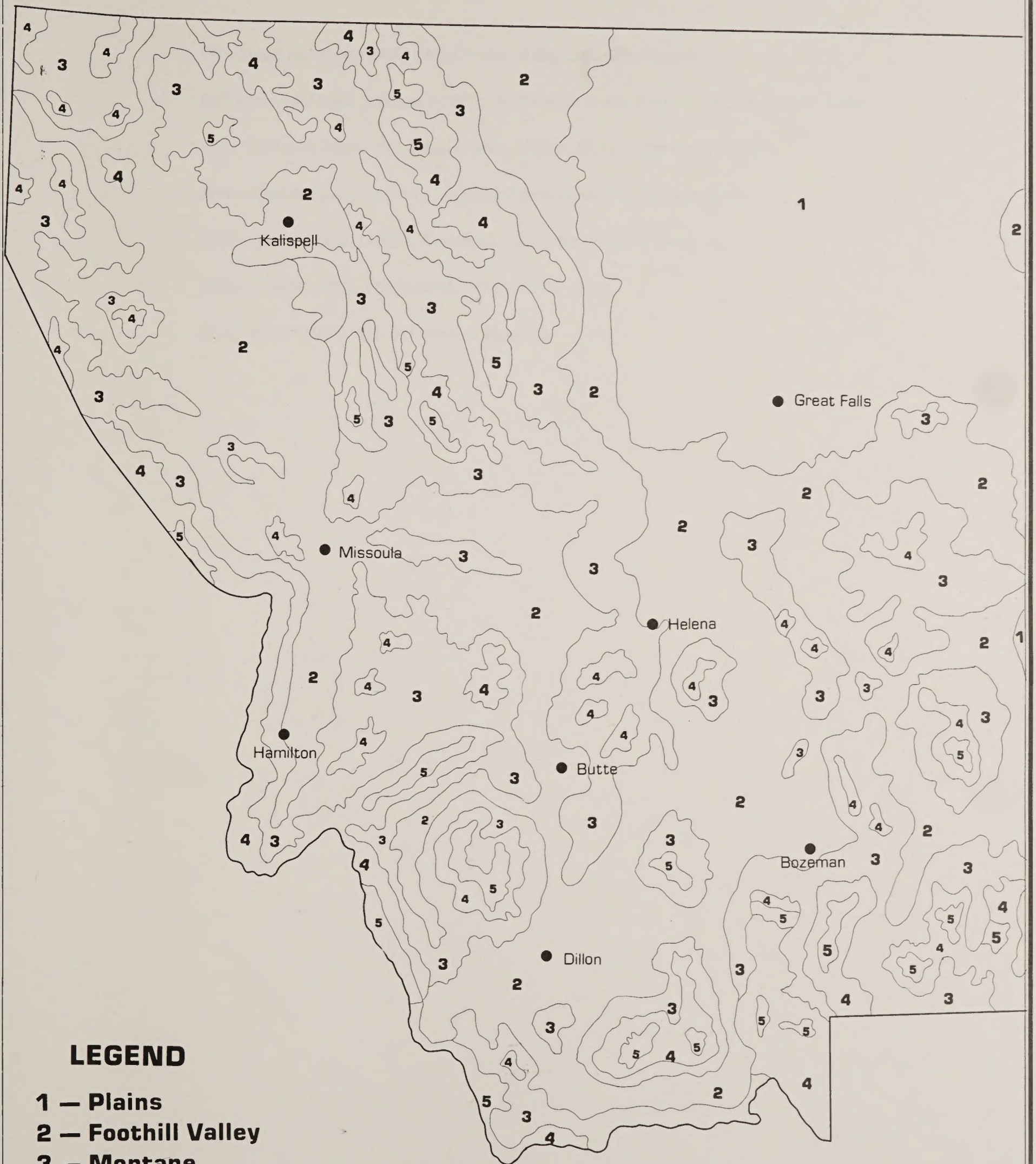
ECOLOGICAL ZONES



LEGEND

- 1 — Plains
- 2 — Foothill Valley
- 3 — Montane
- 4 — Subalpine
- 5 — Alpine

ECOLOGICAL ZONES



LEGEND

- 1 — Plains
- 2 — Foothill Valley
- 3 — Montane
- 4 — Subalpine
- 5 — Alpine

Reference Shorthand Key

CP - Budd and Best (1969), Wild Plants of the Canadian Prairies

ECI - Brunsfeld and Johnson (1985), Field Guide to the Willows of East-Central Idaho

GP - The Great Plains Flora Association (1986), Flora of the Great Plains

NW - Hitchcock et al. (1964), Vascular Plants of the Pacific Northwest

RDT - Hansen et al. (1988), Riparian Dominance Types of Montana

VPM - Dorn (1984), The Vascular Plants of Montana

WM - Dorn (1970), The Willows of Montana

Facts About Willows (Salix)

Origin of Name: Celtic; sal-near, lis-water

Pronunciation: Sa (emphasis, a as in fate) likes.

Size of genus: 300+ species, 175 in North America

Distribution: Both hemispheres; Africa, South America to Arctic; sea level to 10,000+ feet.

Bark: Young smooth, brown to olive to yellow; mature deep, irregular furrows.

Wood: Soft, easy to cut, often very rapidly growing.

Pollination: Usually by insects, sometimes by wind.

Hybridization: Found to be of minor importance in east-central Idaho by Brunsfeld, but occurs where the ranges of closely related species overlap. Problematic in many places, probably not in Montana except in the case of exotic species such as Weeping Willow, White Willow, and Crack Willow.

Seeds: Numerous, minute (2-3 million per lb.), long, hairy ("cotton"), remain viable for only a few days, should be stored at room temperature with 50 plus percent humidity (then viability may last several weeks).

Vegetative Propagation: Fairly easy to root young branches. Growth hormones such as Indolacetic Acid or Indolbutyric Acid (commercial "Rootone," "Dexol") greatly increase chances of success.

Early Uses:

Eurasian: Dioscordies (Greek physician) described willow's medicinal qualities circa 60 A.D. Widespread use of bark for tonic, astringent, antiperiodic. Useful for worms, indigestion, diarrhea, dysentery.

American Indian: Similar to Eurasian, also as a purge, to clean teeth, prevent cavities, relieve headaches. Wood, twigs used for pins, pegs, backrests, fishtraps, foxtraps, cradle boards, walking sticks, gambling wheels, stirrups, scrapers, baskets, drums, ropes, and meat racks.

Ecology: Either obligate or facultative wetland. Usually found close to supplemental water, although *S. scouleriana* is common in the more xeric forest, establishing after fires or avalanche. Most species found in cooler climates. Usually mesic to hydric soils.

PLAINS ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Trees, usually with one main trunk at the base; introduced or native
 - 2a. Twigs pendulous; introduced, usually obviously planted
 - 3a. Twigs olive or brown...*S. babylonica*
 - 3b. Twigs yellow or yellow green...*S. alba* var *tristis*
 - 2b. Twigs spreading or ascending, introduced or native
 - 4a. Leaves usually green and dull dorsally, glaucous ventrally; native. (Note - if catkins are precocious, key as a shrub)...*S. amygdaloides*
 - 4b. Leaves usually dark green, shining dorsally, glaucous or pale ventrally; introduced, usually obviously planted.
 - 5a. Twigs not brittle at base; glandular processes not present on petioles near base of leaf blade or occasionally present on a few; leaves elliptic to lanceolate...*S. alba*
 - 5b. Twigs either brittle and easily broken off at the base or glandular processes present on most petioles near base of leaf blade or both, leaves various.
 - 6a. Leaves narrowly-elliptic to lanceolate, more than 3 times longer than wide, usually glaucous ventrally...*S. fragilis*
 - 6b. Leaves broadly-lanceolate to ovate, more abruptly acuminate, less than 3 times longer than wide, pale ventrally....*S. pendantra*
- 1b. Shrubs, several to many stems at base, native
 - 7a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit...*S. exigua*
 - 7b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various.
 - 8a. Leaves about equally green on both sides...*S. lasiandra*
 - 8b. Leaves obviously lighter ventrally
 - 9a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate, usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally...*S. candida*
 - 9b. Leaves not as above
 - 10a. Plants with mature pistillate catkins
 - 11a. Capsules glabrous
 - 12a. Scales yellow, deciduous in fruit...*S. lasiandra*
 - 12b. Scales dark, persistent in fruit...*S. lutea*
 - 11b. Capsules hairy
 - 13a. Leaves mostly over 5 times as long as wide, usually sharply serrate; styles 0.1-0.3 mm long...*S. petiolaris*
 - 13b. Leaves, if as much as 5 times as long as wide, not sharply serrate and the styles 0.3-.8+ mm long...*S. discolor*
 - 10b. Plants without mature pistillate catkins, leaves mature
 - 14a. Petioles usually with glands near base of leaf; leaf tips usually long, acuminate
 - 15a. Leaves mostly over 4 times as long as wide...*S. lasiandra*
 - 15b. Leaves mostly less than 4 times as long as wide...*S. serissima*
 - 14b. Petioles usually without glands; leaves mostly acute or rounded
 - 16a. Older branchlets somewhat silvery-gray, leaves mostly lanceolate...*S. lutea*
 - 16b. Older branchlets not silvery-gray, leaves mostly elliptic, oblanceolate, or ovate
 - 17a. Leaves usually 5 times or more as long as wide, sharply serrate...*S. petiolaris*
 - 17b. Leaves mostly less than 5 times as long as wide, mostly crenate...*S. discolor*

FOOTHILLS/VALLEY ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Trees, usually with one main trunk at the base; introduced or native
 - 2a. Twigs pendulous; introduced, usually obviously planted
 - 3a. Twigs olive or brown...*S. babylonica*
 - 3b. Twigs yellow or yellow green...*S. alba* var *tristis*
 - 2b. Twigs spreading or ascending, introduced or native
 - 4a. Leaves usually green and dull dorsally, glaucous ventrally; native. (Note: if catkins are precocious, key as a shrub)...*S. amygdaloides*
 - 4b. Leaves usually dark green, shining dorsally, glaucous or pale beneath; introduced, usually obviously planted
 - 5a. Twigs not brittle at base; glandular processes not present on petioles near base of leaves or occasionally present on a few; leaves elliptic to lanceolate...*S. alba*
 - 5b. Twigs either brittle and easily broken off at the base or glandular processes present on most petioles near base of leaves or both; leaves various
 - 6a. Leaves narrowly-elliptic to lanceolate, more than 3 times longer than wide, usually glaucous ventrally...*S. fragilis*
 - 6b. Leaves broadly-lanceolate to ovate, more abruptly acuminate, less than 3 times longer than wide, pale ventrally...*S. pendantra*
- 1b. Shrubs, several to many stems at base; native.
 - 7a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit...*S. exigua*
 - 7b. Leaves not linear, width various, usually less than 6x as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
 - 8a. Twigs of the previous year, and sometimes of the current season, pruinose, sometimes only apparent at nodes especially behind buds
 - 9a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; leaves usually silvery pubescent ventrally, green and glabrous or glabrate dorsally...*S. drummondiana*
 - 9b. Catkins .7-1.5 cm, loosely flowered, with leafy floriferous branchlets; leaves green sericeous on both sides...*S. geeyeriana*
 - 8b. Twigs not pruinose
 - 10a. Leaves about equally as green on both sides
 - 11a. Plants with mature pistillate catkins
 - 12a. Scales yellow, deciduous in fruit; petioles with glands near base of leaf on upper side...*S. lasiandra*
 - 12b. Scales dark, persistent in fruit; petioles lacking glands...*S. monochroma*
 - 11b. Plants without mature pistillate catkins, with mature leaves
 - 13a. Mature leaves lanceolate and long acuminate; petioles with glands near the tip...*S. lasiandra*
 - 13b. Mature leaves sometimes lanceolate but not long acuminate; petioles usually lacking glands...*S. monochroma*
 - 10b. Leaves obviously lighter ventrally
 - 14a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate, usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally.
 - 15a. Pistillate catkins sessile or nearly so, leaves mostly narrowly elliptic...*S. drummondiana*
 - 15b. Pistillate catkins with leafy floriferous branchlets 5-20 mm long, leaves mostly oblanceolate to obovate...*S. sitchensis*
 - 14b. Leaves not as above
 - 16a. Plants with mature pistillate catkins
 - 17a. Capsules glabrous

- 18a. Scales yellow, green or whitish, deciduous in fruit
- 19a. Capsules mostly 7mm long or less, maturing in spring, streambanks and ditches...*S. lasiandra*
- 19b. Capsules 7-12 mm long when mature, maturing in late summer; swamps and bogs...*S. serissima*
- 18b. Scales often dark, persistent in fruit...*S. lutea*
- 17b. Capsules pubescent
 - 20a. Stipes 2-5 mm long; stiles .4mm or less long; young twigs usually red-purple, appressed hairy; bark of older twigs cracked giving a white streaked appearance...*S. bebbiana*
 - 20b. Stipes 2 mm or less long, or, if as long as 3 mm, the styles often over .4 mm long and twigs not as above
 - 21a. Plants mostly to 1.5 m high, pistillate catkins coetaneous on leafy, floriferous branchlets 2-25 mm long; leaves and twigs often pubescent...*S. brachycarpa*
 - 21b. Plants usually well over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm; leaves and twigs glabrous or hairy; "skunky" odor when bark stripped from living twigs of the previous year...*S. scouleriana*
- 16b. Plants without mature pistillate catkins, with mature leaves
 - 22a. Petioles usually with glands near base of leaves; leaf tips mostly long- acuminate...*S. lasiandra*
 - 22b. Petioles usually without glands, leaf tips mostly acute or rounded
 - 23a. Twigs of the year usually red-purple and appressed-hairy, bark of older twigs cracked giving a white-streaking appearance, mature buds with depressed margins...*S. bebbiana*
 - 23b. Twigs and buds not as above
 - 24a. Plants with mostly oblanceolate to obovate leaves; freshly stripped bark of living twigs of previous year usually with a "skunky" odor, usually over 2 m high, often in dryer woods...*S. scouleriana*
 - 24b. Plants not as above
 - 25a. Leaves mostly entire or nearly so...*S. brachycarpa*
 - 25b. Leaves mostly toothed
 - 26a. Older twigs somewhat silvery-gray, leaves mostly lanceolate...*S. lutea*
 - 26b. Older twigs not silvery-gray, leaves often predominantly elliptic, oblanceolate, or ovate
 - 27a. Leaves usually 5 times or more as long as wide, sharply serrate...*S. petiolaris*
 - 27b. Leaves mostly less than 5 times as long as wide, mostly crenate...*S. discolor*

MONTANE ECOLOGICAL ZONE KEY

(Dividers courtesy of Robert Dorn)

- 1a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit
 - 2a. Leaves green on both sides, often pubescent, scales often lanceolate or lance-linear, pubescent or some times glabrate...*S. exigua*
 - 2b. Leaves usually glaucous or glaucescent ventrally, glabrous when expanded; scales broader than 2a, glabrous or sometimes pubescent at base...*S. melanopsis*
- 1b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
 - 3a. Twigs pruinose, sometimes only apparent at nodes especially behind buds
 - 4a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; stipes 0.1-0.8 mm long; leaves usually densely silvery pubescent ventrally, green and glabrous or glabrate dorsally...*S. drummondiana*
 - 4b. Catkins .8-2.5 cm long, loosely flowered with leafy, floriferous branchlets 2-18 mm long; stipes 1-3 mm long; leaves not as above
 - 5a. Leaves about equally green and sericeous on both sides; scales mostly tan or brown...*S. geeyeriana*
 - 5b. Leaves green and glabrate dorsally, mostly glaucous ventrally; scales mostly black or dark brown...*S. lemmonii*
 - 3b. Twigs not pruinose
 - 6a. Leaves about equally green on both sides
 - 7a. Plants with mature pistillate catkins
 - 8a. Capsules pubescent...*S. wolfii*
 - 8b. Capsules glabrous
 - 9a. Scales yellow, green or whitish, deciduous in fruit; petioles with glands near base of leaves on upper side...*S. lasiandra*
 - 9b. Scales often dark, persistent in fruit; petioles usually lacking glands...*S. wolfii*
 - 7b. Plants without mature pistillate catkins, with mature leaves
 - 10a. Mature leaves lanceolate and long-accuminate at tip; petioles with glands near the base of the blade...*S. lasiandra*
 - 10b. Leaves sometimes lanceolate but not long-accuminate; petioles usually lacking glands
 - 11a. Leaves broadly elliptic, ovate or obovate, very finely glandular-toothed; twigs spreading pubescent...*S. tweedyi*
 - 11b. Leaves often elliptic, lanceolate, or oblanceolate, entire or toothed, sometimes glandular; twigs various
 - 12a. Plants mostly less than 2 m high; mature leaves often densely silvery pubescent...*S. wolfii*
 - 12b. Plants often over 2 m high; mature leaves mostly sparsely pubescent to glabrous...*S. boothii*
 - 6b. Leaves obviously lighter ventrally
 - 13a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate; usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally
 - 14a. Pistillate catkins sessile or nearly so; leaves mostly narrowly elliptic...*S. drummondiana*
 - 14b. Pistillate catkins with leafy floriferous branchlets 5-20 mm long, leaves mostly oblanceolate to obovate...*S. sitchensis*
 - 13b. Leaves not as above
 - 15a. Plants with mature pistillate catkins
 - 16a. Capsules glabrous
 - 17a. Scales yellow, green, or whitish, deciduous in fruit...*S. lasiandra*

- 17b. Scales often dark, persistent in fruit
 - 18a. Stipes 0.3-2 mm long; catkins on floriferous branchlets 3-15 mm long; leaves usually glabrous, elliptic to elliptic-obovate, often entire...*S. farriar*
 - 18b. Stipes, catkins, and leaves without the characteristics combined as above...*S. pseudomonticola*
- 16b. Capsules pubescent
 - 19a. Stipes mostly 2-5 mm long; styles 0.4 mm or less long, twigs of the year usually red-purple and appressed pubescent, bark of older twigs cracked giving a white streaking appearance...*S. bebbiana*
 - 19b. Stipes 2 mm or less long, or if as long as 3 mm, the styles often over 0.4 mm long and twigs not as above
 - 20a. Plants mostly to 1.5 m high, pistillate catkins coetaneous on leafy floriferous branchlets 2-25 mm long, leaves and twigs often pubescent...*S. brachycarpa*
 - 20b. Plants often over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or sometimes with floriferous branchlets to 13 mm long; leaves and twigs pubescent or glabrous
 - 21a. Stipes 0-2 mm long, leaves elliptic or narrowly oblanceolate and often entire, twigs of the previous year chestnut to red to red purple, usually shiny, stigmas less than 0.5 mm long
 - 22a. Pistillate catkins with leafy floriferous branchlets to 1 cm long, rarely subsessile; stipes 0.5-2 mm long; styles 0.2-0.9 mm long...*S. lemmonii*
 - 22b. Pistillate catkins sessile or subsessile, stipes 0-1 mm long, styles 0.4-1.5 mm long, ...*S. planifolia* var *planifolia*
 - 21b. Stipes 0.8-3 mm long; leaves obovate to broadly oblanceolate, or if elliptic, then usually coarsely toothed; twigs of previous year yellowish to reddish-brown, dull; stigmas usually over 0.5 mm long ...*S. scouleriana*
- 15b. Plants without mature pistillate catkins, with mature leaves
 - 23a. Petioles usually with glands near base of leaves, leaf tips mostly long- acuminate...*S. lasiandra*
 - 23b. Petioles usually without glands, leaf tips mostly acute to rounded
 - 24a. Twigs of the year usually red-purple and appressed pubescent, bark of older twigs cracked giving a white-streaking appearance; mature buds with depressed margins...*S. bebbiana*
 - 24b. Twigs and buds not as above
 - 25a. Plants with mostly oblanceolate leaves, freshly stripped bark from twigs of the previous year usually with a skunky odor, shrub or tree over 2 m high, often in dryer woods and clearings...*S. scouleriana*
 - 25b. Plants not as above
 - 26a. Leaves entire or nearly so
 - 27a. Leaves glabrous or nearly so
 - 28a. Leaves mostly 5 times as long as wide...*S. lemmonii*
 - 28b. Leaves mostly less than 5 times as long as wide
 - 29a. Twigs usually shiny and reddish, dorsal leaf surface shiny ...*S. planifolia* var *planifolia*

- 29b. Twigs mostly dull brownish,
greenish or blackish; dorsal leaf
surface dull...*S. farriae*
- 27b. Leaves tomentose...*S. brachycarpa*
- 26b. Most leaves toothed
- 30a. Leaves only slightly lighter beneath, very
finely glandular toothed, twigs of the year with
long spreading hairs....*S. tweedyi*
- 30b. Leaves glaucous ventrally, often coarsely
toothed; twigs of the year often glabrous or
with appressed hairs
- 31a. Leaves mostly elliptic, dark green and
shiny dorsally, twigs usually reddish
and shiny...*S. planifolia* var *planifolia*
- 31b. Leaves mostly lanceolate to ovate to
obovate, if elliptic, the leaves usually
not shiny dorsally and the twigs not
reddish and shiny...*S. pseudomonticola*

SUBALPINE ECOLOGICAL ZONE KEY

(Dividers Courtesy of Robert Dorn)

- 1a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit
...*S. melanopsis*
- 1b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
 - 2a. Twigs pruinose, sometimes only apparent at nodes especially behind buds
 - 3a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; stipes 0.1-0.8 mm long; leaves usually densely silvery pubescent beneath, green and glabrous or glabrate above...*S. drummondiana*
 - 3b. Catkins .8-2.5 cm long, loosely flowered, with leafy floriferous branchlets 2-18 mm long; stipes 1-3 mm long; leaves not as above
 - 4a. Leaves about equally green and sericeous on both sides, scales mostly tan or brown
...*S. geyeriana*
 - 4b. Leaves green and glabrate above, mostly glaucous beneath, scales mostly black or dark brown...*S. lemmonii*
 - 2b. Twigs not pruinose
 - 5a. Leaves about equally green on both sides
 - 6a. Plants with mature pistillate catkins
 - 7a. Capsules pubescent
 - 8a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at the tips of twigs of the previous year...*S. barrattiana*
 - 8b. Styles 0.2-1.9 mm long; twigs not glutinous; catkins not at the tips of twigs of the previous year, subsessile or with floriferous branchlets to 20 mm long
 - 9a. Catkins 1-5 cm long, young leaves with prominently glandular margins...*S. eastwoodiae*
 - 9b. Catkins 0.8-2 cm long, young leaves usually lacking glands on margins...*S. wolfii*
 - 7b. Capsules glabrous
 - 10a. Styles 1-3 mm long, some catkins at tips of twigs of the previous year
...*S. tweedyi*
 - 10b. Styles 0.2-1.5 mm long, catkins not at the tips of twigs of the previous year
 - 11a. Catkins mostly 0.8-2 cm long, stipes 0-0.8 mm long...*S. wolfii*
 - 11b. Catkins mostly 1-9 cm long, stipes 0.3-4 mm long...*S. commutata*
 - 6b. Plants without mature pistillate catkins, with mature leaves
 - 12a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
 - 12b. Twigs not glutinous
 - 13a. Leaves broadly elliptic, ovate, or obovate, very finely glandular-toothed; twigs of the year with long, spreading pubescence...*S. tweedyi*
 - 13b. Leaves often elliptic, lanceolate, or oblanceolate, entire or toothed, sometimes also glandular; twigs various
 - 14a. Young leaves with prominently glandular margins...*S. eastwoodiae*
 - 14b. Young leaves often without glandular margins
 - 15a. Leaves mostly broadly elliptic, ovate, or obovate, often densely pubescent with long, loose hairs...*S. commutata*
 - 15b. Leaves mostly lanceolate or elliptic, glabrous or pubescent
 - 16a. Plants mostly less than 2 m high; mature leaves often densely silvery pubescent...*S. wolfii*
 - 16b. Plants often over 2 m high, mature leaves mostly sparsely pubescent to glabrous...*S. boothii*
 - 5b. Leaves obviously lighter ventrally than dorsally
 - 17a. Leaves elliptic-obovate to oval, mostly leathery, dark green dorsally, silvery hairy ventrally becoming glabrate; some catkins at tips of twigs of the season...*S. vestita*

- 17b. Leaves and catkins not as above
 - 18a. Leaves narrowly elliptic, oblong, oblanceolate, to lanceolate, usually very densely white or silvery pubescent ventrally, glabrous or glabrate and green dorsally; stipes 1 mm or less long...*S. drummondiana*
 - 18b. Leaves not as above, stipes various
 - 19a. Plants with mature pistillate catkins
 - 20a. Capsules glabrous
 - 21a. Stipes 0.3-2 mm long; catkins on floriferous branchlets 3-15 mm long; leaves usually glabrous, elliptic to elliptic-obovate, often entire...*S. farriar*
 - 21b. Stipes, catkins, and leaves without characteristics combined as above
 - 22a. Catkins on floriferous branchlet(s) 10-30 mm long...*S. barclayi*
 - 22b. Catkins sessile or on floriferous branchlets 8-12 mm long
 - 23a. Catkins, or some of them, at tips of twigs of the previous years styles 1-3 mm long; leaves finely glandular toothed...*S. tweedyi*
 - 23b. Catkins not at the tips of twigs of the previous year, styles 0.5-1.8 mm long; leaves crenate-serrate...*S. pseudomonticola*
 - 20b. Capsules pubescent
 - 24a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at tips of twigs of the previous year...*S. barrattiana*
 - 24b. Styles, twigs, and catkins not combined as above
 - 25a. Plants mostly to 1.5 m high; pistillate catkins coetaneous on leafy, floriferous branchlets 2-25 mm long; leaves and twigs often pubescent
 - 26a. Pistillate catkins 0.5-2 cm long, floriferous branchlets 2-10 mm long, stipes less than 0.5 mm long, petioles mostly 1-3 mm long...*S. brachycarpa*
 - 26b. Pistillate catkins (1.5) 2-5 cm long, floriferous branchlets 5-25 mm long, stipes 0-1.5 mm long, petioles often over 3 mm long...*S. glauca*
 - 25b. Plants often over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm long; leaves and twigs glabrous or pubescent
 - 27a. Pistillate catkins with leafy floriferous branchlets to 1 cm long, rarely subsessile; stipes 0.5-2 mm long; styles 0.2-0.7 mm long...*S. lemmonii*
 - 27b. Pistillate catkins sessile to subsessile; stipes 0.1 mm long, styles 0.4-1.5 mm long...*S. planifolia*
 - 19b. Plants without mature pistillate catkins, with mature leaves
 - 28a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
 - 28b. Twigs not glutinous
 - 29a. Most leaves entire or nearly so
 - 30a. Leaves glabrous or nearly so
 - 31a. Leaves mostly 5 times or more as long as wide...*S. lemmonii*
 - 31b. Leaves mostly less than 5 times as long as wide
 - 32a. Twigs usually shiny and reddish; upper leaf surface shiny...*S. planifolia*
 - 32b. Twigs mostly dull brownish, greenish, or blackish; leaf surface dull...*S. farriar*

- 30b. Leaves usually obviously hairy, rarely glabrate
 - 33a. Leaves 1.5-7 cm long, usually sparsely to moderately pubescent; petioles mostly over 3 mm long
...*S. glauca*
 - 33b. Leaves 0.5-4 cm long, usually densely pubescent; petioles mostly less than 3 mm long...*S. brachycarpa*
- 29b. Most leaves toothed
 - 34a. Leaves only slightly lighter beneath, very finely glandular; twigs of the year with long, spreading pubescent
...*S. tweedyi*
 - 34b. Leaves glaucous ventrally, often more coarsely toothed; twigs often glabrous or with appressed hairs
 - 35a. Leaves mostly elliptic, dark green and shiny above; twigs usually reddish and shiny...*S. planifolia*
 - 35b. Leaves mostly lanceolate to ovate or obovate, if elliptic, the leaves not shiny above and the twigs not reddish and shiny
 - 36a. Leaf midrib and petiole often red, blade usually ovate, obovate, or broadly elliptic, twigs of the year pubescent
...*S. pseudomonticola*
 - 36b. Leaf midrib and petiole usually green, blades often lanceolate, elliptic, or oblanceolate; twigs of year often glabrous...*S. barclayi*

ALPINE ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Plants creeping shrubs 1-8 cm high, sometimes higher in *S. arctica*
 - 2a. Leaves 7 (9) mm or less long, not glaucous; capsules glabrous; usually on limestone...*S. rotundifolia*
 - 2b. Leaves mostly over 7 mm long, often glaucous ventrally; capsules pubescent
 - 3a. Leaf tip usually rounded, blade prominently reticulate-veined ventrally, styles less than 0.5 mm long...*S. reticulata*
 - 3b. Leaf tip usually pointed, blades not reticulate-veined; styles 0.3-2 mm long
 - 4a. Leaves mostly elliptic to oval, glaucous ventrally, old ones usually not persisting; catkins 1-5 cm long; sometimes over 8 cm tall in protected places...*S. arctica*
 - 4b. Leaves narrowly elliptic to elliptic, usually green beneath, old ones often persisting; catkins mostly 0.6-2 cm long...*S. cascadiensis*
- 1b. Plants usually erect shrubs over 8 cm high, sometimes creeping in *S. vestita*, *S. glauca*
 - 5a. Leaves about equally green on both sides
 - 6a. Plants with mature pistillate catkins
 - 7a. Capsules pubescent...*S. barrattiana*
 - 7b. Capsules glabrous...*S. tweedyi*
 - 6b. Plants without mature pistillate catkins
 - 8a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
 - 8b. Twigs not glutinous...*S. tweedyi*
 - 5b. Leaves obviously lighter ventrally than dorsally
 - 9a. Leaves elliptic-obovate to oval, mostly leathery, dark green dorsally, silvery hairy ventrally (becoming glabrate), some catkins at tips of twigs of the season; rarely low, creeping...*S. vestita*
 - 9b. Leaves and catkins not as above
 - 10a. Plants with mature pistillate catkins
 - 11a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at the tips of twigs of the previous year...*S. barrattiana*
 - 11b. Styles, twigs, and catkins not combined as above
 - 12a. Pistillate catkins coetaneous on leafy floriferous branchlets 2-25 mm long; leaves and twigs often pubescent; rarely low, creeping...*S. glauca*
 - 12b. Pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm long; twigs glabrous or pubescent...*S. planifolia* var *monica*
 - 10b. Plants without mature pistillate catkins, mature leaves
 - 13a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
 - 13b. Twigs not glutinous
 - 14a. Most leaves entire or nearly so
 - 15a. Leaves glabrous or nearly so...*S. planifolia* var *monica*
 - 15b. Leaves usually obviously pubescent, rarely glabrate; rarely low creeping...*S. glauca*
 - 14b. Most leaves toothed
 - 16a. Leaves only slightly lighter ventrally, very finely glandularly toothed; twigs with long, spreading pubescence...*S. tweedyi*
 - 16b. Leaves glaucous ventrally, often more coarsely toothed; twigs often glabrous or with appressed pubescence...*S. planifolia* var *monica*



Salix L.
Willow
Genus Description

Vegetative Structures

Habit: large tree to prostrate shrub

Leaves

Shape: very variable, from obovate to linear.

Structure: simple

Placement: alternate

Margins: entire to serrate to crenate serrate

Petioles: much shorter than leaf blades, sometimes glandular at summit

Stipules: persistent or deciduous or caducous or absent

Remarks: Plants of wet to moist places, often an important component of riparian areas (both climax and seral), often phreatophytic

Sexual Structures

Catkins: Erect to pendulous, usually coetaneous, sometimes precocious or serotinous, sometimes subtended by a bract (not to be confused with floral bracts which are herein called scales)

Flowers: Unisexual, subtended by a scale (floral bract) or 1-2 nectar glands or cupular disk

Perianth: absent or vestigial

Stamens: 1 to 12+

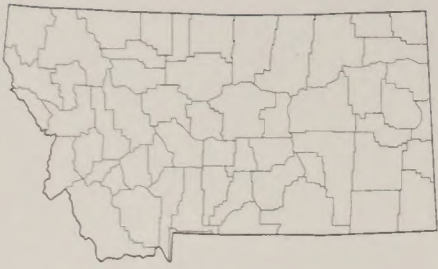
Pistils: 1, bicarpellate

Stigmas: 2 to 4 lobed

Styles: well developed to none, 1

Ovary: superior

Fruit: 2 valved capsule



Introduced



Salix alba L.
White Willow

General

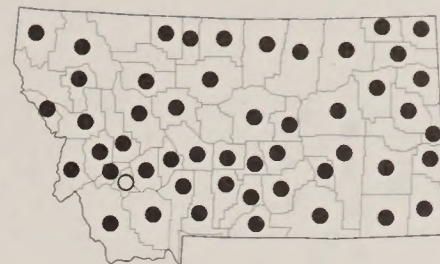
Synonyms: —
Other common name(s): —
Reference(s): GP, ECI
Pronunciation: al- (emphasis) ba ('a' as in Persia)
Ecological Zone(s): Foothills/Valley, Plains
Wetland status: facultative
Remarks: Var. *vitellina* Stokes-exotic, Yellowstem White Willow, escapes cultivation on the plains; var. *calva* G.F. May - exotic, White Willow, planted on plains and in western valleys. Probably does not escape, many cultivars. Introduced for aspirin (acetylsalicylic acid) gunpowder, aesthetics, sentiment, shade from Europe in colonial times.

Vegetative Structures

Habit: medium tree
Height: 30 meters (100 ft.)
Twigs: weeping and yellow to yellow-green in var. *tristis*; golden yellow to orange in var. *vitellina*; finely appressed pubescent at least on twigs forming in summer
Mature leaves:
Dorsal: glabrous, shiny green
Ventral: strongly glaucous, lighter
Margin: serrate
Length: 10-15 cm
Width: 25-40 mm
Shape: lanceolate to elliptic, acuminate
Stipules: caducous
Remarks: Leaves often silky pubescent ventrally when young, often asymmetric at tip - at least in var. *vitellina*

Sexual Structures

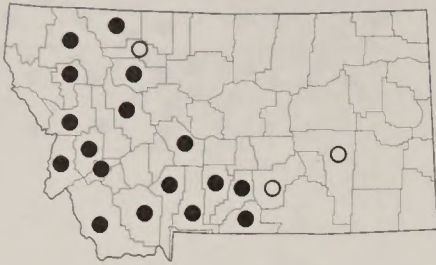
Catkins, general
Emergence time: coetaneous
Scale color: pale to yellowish green
Scale hair: pubescent
Catkins, staminate
Length: 3-5 cm
Width:
Catkins, pistillate
Length: 5-7 mm
Capsules
Length: 3.5-5 mm
Other: ovoid-conic, glabrous
Styles: .2-.4 mm
Stigmas: —
Stamens: 2
Remarks: Flowers in May



Salix amygdaloides Anderss
Peachleaf Willow

General	Vegetative Structures	Sexual Structures
Synonyms: —	Habit: tall shrub or medium tree	Catkins, general
Other Common Name(s): —	Height: 12 meters (40 ft.), trunk often leaning	Emergence time: coetaneous
Reference(s): CP, GP, NW, RDT, VPM, WM	Twigs: slender, yellow to reddish brown, not brittle, spreading to drooping	Scale color: yellowish
Pronunciation: a- ('a' as in Persia) mig- (emphasis) dal-oid ('o' as in note), ez ('e' as in mete)	Mature leaves:	Scale hair: deciduous, villous
Ecological Zone(s): Foothills/Valley, Plains	Dorsal: glabrous yellow green	Catkins, staminate
Wetland Status: facultative	Ventral: glaucous	Length: 4-7 cm
Remarks: Grows along the major water courses in the state. Common on floodplains. Alluvial soil. Cheyenne Indians made a tea from the bark for diarrhea.	Margin: finely serrate	Width: 6-10 mm
	Length: 3-10 cm	Catkins, pistillate
	Width: 10-30 mm	Length: 3-8 cm
	Shape: lanceolate to oblanceolate, acuminate	Capsules
	Stipules: usually caducous	Length: 5-7 mm
	Remarks: Bark light brown	Other: glabrous, ovoid
		Styles: .2-.4 mm
		Stigmas: bilobed, .2-.5 mm
		Stamens: 4-7
		Remarks: Flowers in May

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde



Salix arctica Pallas
Arctic Willow

General

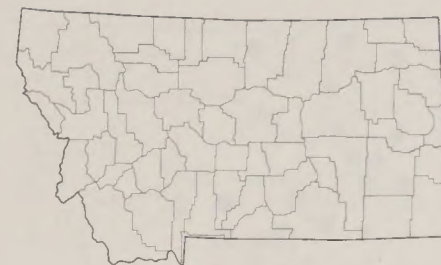
Synonyms: *S. anglorum* (Cham.)
Other common name(s): Creeping Willow; Arctic Willow
Reference(s): ECI, VPM, WM
Pronunciation: ar- ('a' as in far) tic- (emphasis) ca ('a' as in Persia)
Ecological Zone(s): Alpine
Wetland Status: facultative
Remarks: Easily confused with *S. reticulata*

Vegetative Structures

Habit: low, creeping shrub
Height: to 8 cm (3.5 in.)
Twigs: glabrous or sparsely hairy, yellowish to purplish-black
Mature leaves:
Dorsal: glabrous, green
Ventral: slightly to medium glaucous, veiny
Margin: entire, finely serrate
Length: .5-4 cm
Width: 6-25 mm
Shape: oblanceolate to elliptic to oval to lanceolate
Stipules: absent or minute
Remarks: Mat forming above treeline. Occasionally more than 8 cm tall in sheltered places. Its mats are looser than *S. cascadiensis* or *S. reticulata*

Sexual Structures

Catkins, general
Emergence time: coetaneous to serotinous
Scale color: dark brown to black
Scale hair: long pubescent
Catkins, staminate
Length: 1-5 cm
Width: -
Catkins, pistillate
Length: 1-6 cm
Capsules
Length: 4-8 mm
Other: villous tomentose
Styles: .3-2 mm
Stigmas: bilobed, 1-2.5 mm (including style)
Stamens: 2
Remarks: —



Introduced



Salix babylonica L.
Weeping Willow

General

Synonyms: —
Other common name(s): —
Reference(s): ECI, WM
Pronunciation: bab-i-lon (emphasis)
-i ('i' as in pin) -ka ('a' as in Persia)
Ecological Zone(s): Foothills/
Valley, Plains
Wetland Status: facultative
Remarks: Exotic. Planted around
habitation (sometimes abandoned)
and on ditchbanks. Rarely escapes.
Introduced from Europe, native of
China (i.e., willow pattern of ceramic
dishes), called *S. babylonica* by L.
for 137th Psalm

Vegetative Structures

Habit: medium tree
Height: 12 meters (40 ft.)
Twigs: weeping, almost to the
ground, olive to brownish
Mature leaves:
Dorsal: glabrous, shiny green
Ventral: strongly glaucous, glabrate
Margin: serrate
Length: 8-12 cm
Width: 10-25 mm
Shape: lanceolate to linear,
acuminate
Stipules: caducous
Remarks: —

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: pale yellow to green
Scale hair: pubescent
Catkins, staminate
Length: 3-6 cm
Width: —
Catkins, pistillate
Length: 1-6 cm
Capsules
Length: 3.5-5 mm
Other: glabrous, ovoid-conic
Styles: nearly obsolete
Stigmas: —
Stamens: 3-5+
Remarks: —



Salix barclayi Anderss
Barclay Willow

General

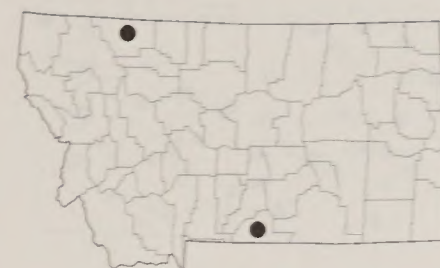
Synonyms: -
Other common name(s): —
Reference(s): ECI, NW, ECI, NW, VPM, WM
Pronunciation: bar- ('a' as in fan) kla- ('a' as in fate) i (emphasis, 'i' as in pine)
Wetland Status: facultative
Ecological Zone(s): Subalpine
Remarks: Along streams and in meadows, hard to distinguish from *S. psuedomonticola*

Vegetative Structures

Habit: medium shrub
Height: 4 meters (3-13 ft.)
Twigs: glabrous to moderate pubescent, dark
Mature leaves:
Dorsal: glaucous, green, midrib pubescent
Ventral: glabrous, glaucous lighter than dorsal
Margin: finely toothed
Length: 1.5-8 mm
Width: 5-35 mm
Shape: obovate to elliptic to oblanceolate to lanceolate
Stipules: eventually deciduous
Remarks: —

Sexual Structures

Catkins, general
Emergence time: coetaneous to serotinous
Scale color: dark brown to black
Scale hair: long pubescent
Catkins, staminate
Length: 1-3 cm
Width: 10-15 mm
Catkins, pistillate
Length: 1-8 cm
Other: glabrous
Styles: .7-2 mm
Capsules: glabrous
Stigmas: .3-.5 mm
Stamens: 2
Remarks: —



Salix barrattiana Hook.
Barratt Willow

General

Synonyms: —
Other common name(s): —
Reference(s): NW, VPM, WM
Pronunciation: bar- ('a' as in fat)
rat- ('a' as in fat) te- (emphasis, 'e'
as in mete) ana ('a' as in fate, 'a' as
in Persia)
Ecological Zone(s): Subalpine,
Montane
Wetland Status: facultative
Remarks: Moist places in high
mountains, easy to confuse with *S.*
planifolia; Considered sensitive in
MT by The Nature Conservancy,
extremely rare in MT, globally
secure.

Vegetative Structures

Habit: low to medium shrub
Height: .3-2 m (1-6 ft.)
Twigs: conspicuously spreading,
villous when young; pubescent,
glutinous when mature
Mature leaves:
Dorsal: villous tomentose, gray
Ventral: villous, tomentose, gray
Margin: usually entire
Length: 4-9 cm
Width: 12-55 mm
Shape: broadly elliptic to elliptic-
oblanceolate to elliptic-obovate to
ovate
Stipules: inconspicuous, caducous
Remarks: Twigs stain pressing
papers yellow or green

Sexual Structures

Catkins, general
Emergence time: coetaneous to
precocious
Scale color: blackish
Scale hair: long pubescent
Catkins, staminate
Length: 3 cm
Width: 15 mm
Catkins, pistillate
Length: 3-9 cm
Capsules: pubescent
Styles: .7-2.5 mm
Stigmas: .3-.5 mm
Stamens: 2
Remarks: —



Salix bebbiana Sarg.
Bebb Willow

General

Synonyms: —

Other common name(s): Beaked willow

Reference(s): CP, ECI, GP, NW, RDT, VPM, WM

Pronunciation: beb-('e' as in met) e- (emphasis, 'e' as in mete) ana ('a' as in fate, 'a' as in Persia)

Ecological Zone(s): Montane, Foothills/Valley

Wetland status: facultative

Remarks: Occurs in many willow habitats, not in the wettest sites, often taller than associated willow species, often on the outer edge of willow thickets. Very common.

Vegetative Structures

Habit: medium to large shrub

Height: 1-4 meters (3-13 ft.)

Twigs: red-purple, appressed pubescent, when young, cracked when older - look streaked, slender, divaricate

Mature leaves:

Dorsal: pubescent to glabrate, deep green

Ventral: villous or glaucous or glabrous, rugous

Margin: usually entire

Length: 4-8 cm

Width: 15-30 mm

Shape: elliptic to elliptic ovate to oval to oblanceolate

Stipules: usually inconspicuous, deciduous

Remarks: Veins prominently raised on the ventral side of leaves.

Sexual Structures

Catkins, general

Emergence time: precocious to coetaneous

Scale color: yellowish to light brown, may have reddish tips

Scale hair: pilose or villous

Catkins, staminate

Length: 1-4 cm

Width: —

Catkins, pistillate

Length: 1.5-6 cm

Capsules

Length: 5-10 mm

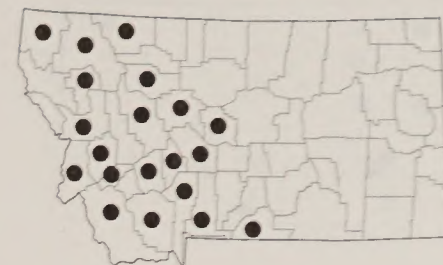
Other: finely short pubescent, ovoid to conic, long beaked

Styles: .1-.4 mm

Stigmas: .3-5 mm

Stamens: 2

Remarks: Flowers in late April to May



Salix boothii Dorn
Booth Willow

General

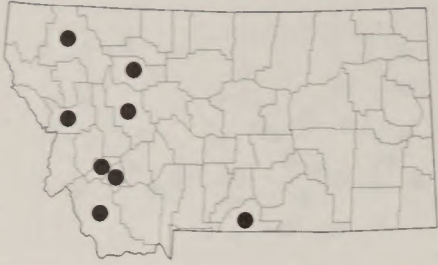
Synonyms: —
Other common name(s): Firmleaf Willow, Blueberry Willow
Reference(s): ECI, RDT, VPM
Pronunciation: booth- ('oo' as in move) i- (emphasis, 'i' as in pine) eye
Ecological Zone(s): Subalpine
Wetland Status: facultative
Remarks: Often associated with *S. drummondiana* and *S. geyeriana*, also associates with *S. bebbiana* and *S. pseudomonticola*. Incorrectly called *S. myrtillofolia* Andress; this is *not* synonymy. Along streams, deep fine texture soils

Vegetative Structures

Habit: medium to large shrub
Height: 1-4 meters (3-13 ft)
Branchlets: yellow, orange or brown, pubescent
Mature leaves:
Dorsal: sparsely pubescent to glabrous, green
Ventral: same
Margin: serrulate to subentire
Length: 1.5-8.5 cm
Width: 6-22 mm
Shape: elliptic to broadly lanceolate
Stipules: persistent, 5-12 mm long
Remarks: Leaves are unique—they are glabrous but not glaucous

Sexual Structures

Catkins, general
Emergence time: coetaneous, sometimes precocious
Scale color: black
Scale hair: densely pubescent, may be glabrous at tip
Catkins, staminate
Length: 1-2 cm
Width: —
Catkins, pistillate
Length: 1-5.5 cm
Other: glabrous
Capsules
Length: 3-6 mm
Other: glabrous
Styles: .3-.8 mm
Stigmas: —
Stamens: 2
Remarks: —



Salix brachycarpa Nutt.
Short Fruited Willow

General

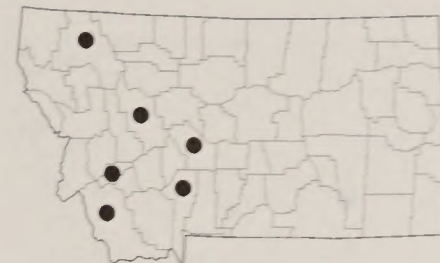
Synonyms: —
Other common name(s): —
Reference(s): CP, ECI, NW, VPM, WM
Pronunciation: brak- ('a' as in fat) e- ('e' as in mete) carp- (emphasis) a ('a' as in Persia)
Ecological Zone(s): Subalpine, Montane, Foothills/Valley
Wetland status: facultative
Remarks: Found at the edges of wet meadows, not on the wettest sites, parent material often calcareous.

Vegetative Structures

Habit: erect, low shrub
Height: .2-2 meters (.6-6 ft.)
Twigs: yellowish brown to reddish brown to dark red, often tomentose
Mature leaves:
Dorsal: tomentose
Ventral: lighter than dorsal, strongly glaucous
Margin: entire
Length: .6-3.2 cm
Width: 3-15 mm
Shape: obovate to elliptic to ovate
Stipules: inconspicuous, deciduous
Remarks: Forms a tight hemisphere when browsed

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: light brown, rarely black
Scale hair: pubescent
Catkins, staminate
Length: .4-2 cm
Width: 5-6 mm
Catkins, pistillate
Length: .5-2 mm
Other: densely pubescent
Capsules
Length: 3-5 mm
Other: densely pubescent
Styles: .5-1.5 mm
Stigmas: sometimes cleft
Stamens: 2
Remarks: Pistillate catkins 10-15 mm wide; catkins numerous, male almost glabrous, dropped later in the season than most willows



Salix candida Fluegge ex. Willd.
Hoary Willow

General

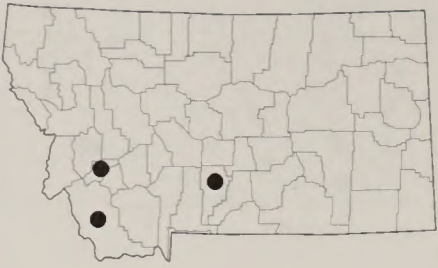
Synonyms: —
Other common name(s): Sageleaf Willow
Reference(s): ECI, GP, NW, CP, VPM, MW
Pronunciation: kan- (emphasis) di- ('i' as in pin) da ('a' as in Persia)
Ecological Zone(s): Subalpine
Wetland status: facultative
Remarks: Wet, mossy bogs; uncommon; wet, organic soils

Vegetative Structures

Habit: low to medium shrub
Height: 1-4 meters, mostly less (.5-13 ft.)
Twigs: yellowish or reddish brown, hairy, thick
Mature leaves:
Dorsal: glabrous, dark green, tomentose
Ventral: pubescent, becoming white tomentose
Margin: revolute entire to serrulate
Length: 1-5 cm
Width: 3-8 mm
Shape: oblanceolate to oblong to narrowly elliptic
Stipules: persistent on vigorous shoots, otherwise caducous, 5-10 mm long,
Remarks: Plants erect with few branches at top

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: yellow to brown
Scale hair: villous
Catkins, staminate
Length: 1.5-2.5 cm
Width: —
Catkins, pistillate
Length: 1.5-6 cm
Capsules
Length: 4-8 mm
Other: white tomentose, ovoid
Styles: .8-1.7 mm
Stigmas: bilobed .2-.5 mm
Stamens: 2
Remarks: Anthers purple, flowers in May



Salix cascadensis Cockerell
Cascade Willow

General

Synonyms: —
Other common name(s): Creeping Willow
Reference(s): NW, VPM, WM
Pronunciation: kas-kad- ('a' as in fate) den- (emphasis) sis
Ecological Zone(s): Alpine
Wetland status: facultative
Remarks: Considered sensitive in MT by The Nature Conservancy, extremely rare in MT, globally secure.

Vegetative Structures

Habit: low creeping shrub
Height: to 8 cm (3-5 in.)
Twigs: —
Mature leaves:
Dorsal: glabrous, green
Ventral: glabrate, green
Margin: entire, sometimes pilose
Length: .5-2.5 cm
Width: 2-8 mm
Shape: narrowly elliptic, acute
Stipules: —
Remarks: Mat forming above treeline, old leaves often persist, plant rhizomatous

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: dark brown to black
Scale hair: long, pubescence longer than scale
Catkins, staminate
Length: .6-1.2 cm
Width: —
Catkins, pistillate
Length: 1-2.5 cm
Capsules
Length: 4-5 mm
Other: villous tomentose
Styles: .3-2 mm
Stigmas: bilobed, .2-.5 mm
Stamens: 2
Remarks: —



Salix commutata Bebb.
Undergreen Willow

General

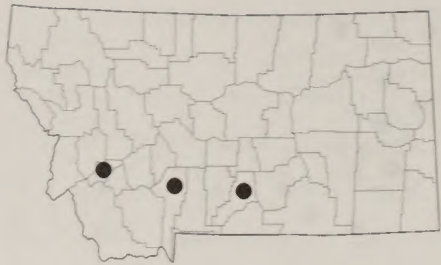
Synonyms: —
Other common name(s):
Greenbacked Willow
Reference(s): ECI, NW, NW, VPM
Pronunciation: kom-mu- (emphasis, 'u' as in mute) tat- ('a' as in fate) a ('a' as in Persia)
Ecological Zone(s): Subalpine
Wetland status: facultative
Remarks: Wet areas, near lakes, several varieties

Vegetative Structures

Habit: medium to large shrub
Height: 1-3 meters (3-10 ft.)
Twigs: spreading erect pubescence, red to brownish
Mature leaves:
Dorsal: long villous, green
Ventral: same
Margin: entire to gland toothed
Length: 1.5-8 cm
Width: 5-35 mm
Shape: elliptic to elliptic-ovate to obovate
Stipules: often persistent, foliaceous
Remarks: Leaves may eventually be glabrate

Sexual Structures

Catkins, general
Emergence time: coetaneous or serotinous
Scale color: light to dark brown
Scale hair: long, wooly villous
Catkins, staminate
Length: 1-3 cm
Width: 10 cm
Catkins, pistillate
Length: 3-9 cm
Capsules
Length: 3-6 mm
Other: glabrous to sparsely hairy
Styles: .5-1 mm
Stamens: 2
Stigmas: more or less lobed
Remarks: —



Salix discolor Muhl.
Pussy Willow

General

Synonyms: —
Other common name(s): —
Reference(s): GP, VPM, WM
Pronunciation: dis- (emphasis) kul-
er ('e' as in her)
Ecological Zone(s): Foothills/
Valley, Plains
Wetland status: facultative
Remarks: Wet places, cultivated for
the pistillate catkins ("Pussy Wil-
lows")

Vegetative Structures

Habit: large shrub or small tree
Height: to 6 meters (20 ft.)
Twigs: stout, reddish to dark brown,
glabrous (pubescent when very
young)
Mature leaves:
Dorsal: dark green
Ventral: pale glaucous
Margin: subentire to serrulate to
crenate
Length: 3-10 cm
Width: 10-30 mm
Shape: elliptic to ovate to obovate
Stipules: 3-10 mm long, roundish to
semi-ovate
Remarks: —

Sexual Structures

Catkins, general
Emergence time: precocious
Scale color: dark brown to black
Scale hair: villous
Catkins, staminate
Length: 1.5 to 5 cm
Width: —
Catkins, pistillate
Length: 2-9 cm
Capsules
Length: 5-10 mm
Other: finely gray pubescent,
ovoid, lanceolate-rostrate
Styles: .3-.8 mm
Stigmas: —
Stamens: 2
Remarks: Flowers in May



Salix drummondiana Barratt.
Drummond Willow

General

Synonyms: —
Other common name(s): Bluestem Willow
Reference(s): ECI, GP, NW, RDT, VPM, WM
Pronunciation: drum- ('u' as in tub) mond-e- ('e' as in mete) ana (emphasis, 'a' as in fate, 'a' as in Persia)
Ecological Zone(s): Montane, Subalpine
Wetland status: facultative
Remarks: Often associated with *S. geyeriana* and *S. boothii*, mostly along streams, may hybridize with *S. sitchensis*, hard to distinguish from *S. lemmonii*

Vegetative Structures

Habit: low to medium shrub
Height: 1-4 meters (5-13 ft.)
Twigs: pruinose, finely pubescent becoming glabrous
Mature leaves:
Dorsal: glabrate to glabrous, green
Ventral: densely, white or silvery pubescent
Margin: entire, revolute
Length: 7-9 cm
Width: 3-30 mm
Shape: elliptic to lanceolate to oblanceolate
Stipules: narrow, caducous
Remarks: —

Sexual Structures

Catkins, general
Emergence time: precocious to coetaneous
Scale color: dark brown to black
Scale hair: long pubescent
Catkins, staminate
Length: 1.5-3 cm
Width: 15 mm
Catkins, pistillate
Length: 1.5-6 cm
Capsules
Length: 3-6 mm
Other: dense, shortly pubescent
Styles: .4-1.3 mm
Stigmas: .2-.6 mm
Stamens: 2
Remarks: Staminate plants are rare

Drawing by David Mattson in "Field Guide to the Willows of East Central Idaho." Permission courtesy of Steven Brunsfled. Map courtesy of Steve Chadde.



Salix eastwoodiae Cockerell
Eastwood Willow

General

Synonyms: —
Other common name(s): —
Reference(s): ECI, VPM
Pronunciation: east-wood-e ('e' as in mete) -a (emphasis, 'a' as in fate)
Ecological Zone(s): Subalpine
Wetland status: facultative
Remarks: Moist but well drained soils

Vegetative Structures

Habit: low to medium shrub
Height: 1-2 meters (3-7 ft.)
Twigs: loosely appressed pubescent, hairs curly or wavy
Mature leaves:
Dorsal: densely pubescent, gray to silver
Ventral: same
Margin: gland toothed, prominently glandular when young
Length: 1-7 cm
Width: 5-20 mm
Shape: elliptic to oblanceolate
Stipules: 1.5-8 mm, sooner or later deciduous
Remarks: Leaves get less pubescent with advancing maturity

Sexual Structures

Catkins, general
Emergence time: precocious to coetaneous
Scale color: dark brown to black
Scale hair: long, wavy
Catkins, staminate
Length: 1-5 cm
Width: —
Catkins, pistillate
Length: 1-5 cm
Capsules
Length: —
Other: densely to sparsely hairy to glabrous
Styles: .4-1.9 mm
Stigmas: —
Stamens:
Remarks: Catkins on leafy branchlets



Salix exigua Nutt.
Streambank Willow

General

Synonyms: *S. melanopsis* Nutt.
Other common name(s): Sandbar Willow, Dusky Willow, Coyote Willow, Slender Willow
Reference(s): ECI, GP, NW, RDT, VPM, WM
Pronunciation: ek- (emphasis) ig- ('i' as in pin) ua ('u' as in mute, 'a' as in Persia)
Ecological Zone(s): Foothills/ Valley, Plains
Wetland status: facultative
Remarks: Very variable, several subspecies and varieties, forms large colonies along streams and ditches. Taxonomic confusion with *S. melanopsis*. The two species overlap, both species form colonies not clumps, this is unique. See appendix C.

Vegetative Structures

Habit: medium to large shrub
Height: 1.4 to 6 meters (5-20 ft.)
Twigs: glabrous, red brown or brown
Mature leaves:
Dorsal: glabrous or pubescent, silvery or gray green
Ventral: same
Margin: entire or finely toothed
Length: 3-15 cm
Width: 4-20 cm
Shape: lance linear to elliptic to lance-elliptic
Stipules: minute or absent
Remarks: These criteria can vary; rhizomatous, seldom higher than 4 meters.

Sexual Structures

Catkins, general
Emergence time: serotinous, coetaneous
Scale color: yellowish
Scale hair: more or less villous
Catkins, staminate
Length: 1.5-6 cm
Width: —
Catkins, pistillate
Length: 1.5-8 cm
Capsules
Length: 4-8 mm
Other: glabrous or pubescent, ovoid
Styles: .2 mm
Stigmas: bilobed
Stamens: 2
Remarks: Flowers in May to June. This is the same drawing as for *S. melanopsis*, except for the pubescent pistil. Scales fall soon after blooming. Anthers yellow.



Salix farrii Ball
Farr Willow

General

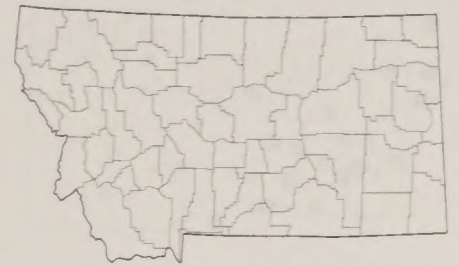
Synonyms: —
Other common name(s): —
Reference(s): ECI, NW, RDT, VPM, WM
Pronunciation: far- ('a' as in far) e- ('e' as in mete) a ('a' as in fate)
Ecological Zone(s): Subalpine, Montane
Wetland status: obligate
Remarks: Common in the Pintlar and Sapphire Ranges; wet meadows

Vegetative Structures

Habit: low shrub
Height: .2-1.5 meter (.5-5 ft.)
Twigs: pubescent becoming glabrous, dull yellowish to reddish-brown; older are dull brown to reddish
Mature leaves:
Dorsal: glabrous, dull, yellow-green
Ventral: glaucous, pale
Margin: entire
Length: 3-6 cm
Width: 10-20 mm
Shape: elliptic to elliptic-obovate to lanceolate
Stipules: small, deciduous
Remarks: —

Sexual Structures

Catkins, general
Emergence time: serotinous
Scale color: dark brown to black
Scale hair: thinly long pubescent to glabrous
Catkins, staminate
Length: 1-2 cm
Width: slender
Catkins, pistillate
Length: 1-3 cm
Capsules
Length: 4-6 mm
Other: glabrous, ovoid
Styles: .4-.7 mm
Stigmas: more or less bilobed
Stamens: 2
Remarks: Scales sometimes have a yellow base



Introduced



Salix fragilis L.
Crack Willow

General

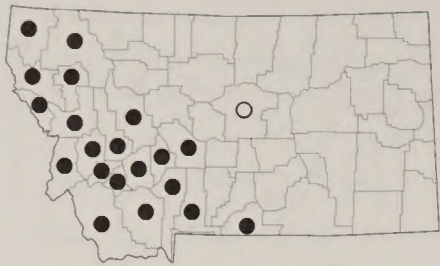
Synonyms: —
Other common name(s): Brittle Willow
Reference(s): GP, VPM, WM
Pronunciation: fraj- (emphasis) i- ('i' as in pin) lis
Ecological Zone(s): Foothills/Valley, Plains
Wetland status: facultative
Remarks: Exotic. Planted along water courses and at habitation (often abandoned). Escapes. Introduced from Europe in colonial times for shade, sentiment, ornament, and gunpowder.

Vegetative Structures

Habit: medium tree
Height: to 20 meters (to 65 ft.)
Twigs: spreading, green to reddish brown, glabrous
Mature leaves:
Dorsal: glabrous, shiny yellow green
Ventral: glaucous
Margin: coarsely glandular serrate
Length: 7-13 cm
Width: 10-30 mm
Shape: lanceolate, to narrowly elliptic, acuminate; often asymmetric
Stipules: well developed but caducous
Remarks: Hybridizes with *S. babylonica* and *S. alba*, causing identification problems

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: yellowish
Scale hair: pubescent, villous at tip
Catkins, staminate
Length: 4-8 cm
Width: —
Catkins, pistillate
Length: 3-8 cm
Capsules
Length: 4.5-5 mm
Other: glabrous, narrowly conic
Styles: .2-.7 mm
Stigmas: —
Stamens: 2
Remarks: Flowers in May



Salix geyeriana Anderss.
Geyer Willow

General

Synonyms: —
Other common name(s): Bluestem Willow
Reference(s): ECI, NW, RDT, VPM, WM
Pronunciation: gey-er-e ('e' as in mete) -ana (emphasis, 'a' as in fate, 'a' as in Persia)
Ecological Zone(s): Montane
Wetland status: facultative
Remarks: Often associated with *S. drummondiana* and *S. boothii*, along streams, in swamps, wet meadows, easy to confuse with *S. lemmonii*

Vegetative Structures

Habit: medium to large shrub
Height: 1.4-7 meters (5-23 ft.)
Twigs: pruinose
Mature leaves:
Dorsal: green, sericeous
Ventral: light green, sericeous
Margin: entire
Length: 3-8 cm
Width: 6-15 cm
Shape: elliptic to lance-elliptic
Stipules: minute, caducous
Remarks: Leaves with small tooth at apex

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: yellowish to red to tan to brown to black
Scale hair: villous to puberulent
Catkins, staminate
Length: .7-1.5 cm
Width: —
Catkins, pistillate
Length: 1-2.5 cm
Capsules
Length: 3-6 mm
Other: thin, shortly pubescent
Styles: .1-.4 mm, stout
Stigmas: bilobed, .2-.4 mm
Stamens: 2
Remarks: Catkins on pubescent, leafy peduncles



Salix glauca L.
Gray Willow

General

Synonyms: *S. glaucops* Andress.
Other common name(s): —
Reference(s): NW, VPM, WM
Pronunciation: gla- (emphasis, 'a' as in fall) ka ('a' as in Persia)
Ecological Zone(s): Montane, Subalpine
Wetland status: facultative
Remarks: Moist, often shaded locations

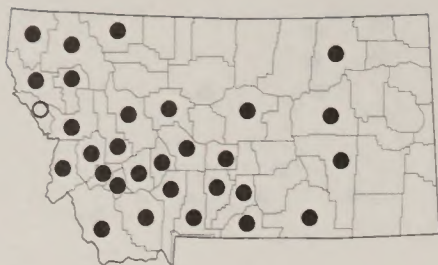
Vegetative Structures

Habit: low to medium shrub
Height: .3-2 meters (1-3 ft.)
Twigs: dark or reddish, villous, tomentose
Mature leaves:
Dorsal: villous-tomentose becoming glabrate
Ventral: same, lighter in color
Margin: entire
Length: 1.5-7 cm
Width: 8-20 mm
Shape: narrowly elliptic to obovate
Stipules: small, deciduous
Remarks: Leaf hairs change with age

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: dark brown to black
Scale hair: pubescent
Catkins, staminate
Length: 1.2-3 cm
Width: —
Catkins, pistillate
Length: 1.5-5 cm
Capsules
Length: 4-8 mm
Other: pubescent
Styles: .4-.8 mm
Stigmas: bilobed, shorter than style
Stamens: 2
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



Salix lasiandra Benth.
Pacific Willow

General

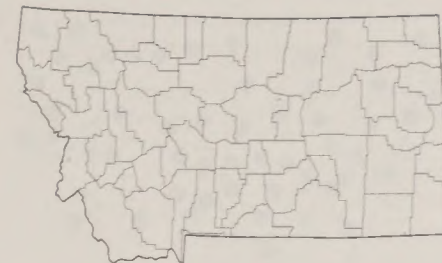
Synonyms: —
Other common name(s): Whiplash Willow, Black Willow
Reference(s): ECI, NW, RDT, VPM, WM
Pronunciation: la- ('a' as in fate) se- ('e' as in mete) andra ('a' as in fat, 'a' as in Persia)
Ecological Zone(s): Foothills/Valley, Plains
Wetland status: facultative
Remarks: Along streams and ditches

Vegetative Structures

Habit: large shrub to small tree
Height: 2-15 meters (6-50 ft.)
Twigs: moderately to densely pubescent, become glabrous with age, yellow to reddish brown
Mature leaves:
Dorsal: finely pubescent, becoming glabrous
Ventral: same
Margin: very finely serrate
Length: 4-15 cm
Width: 8-30 mm
Shape: narrowly elliptic to lanceolate, long, acuminate
Stipules: well developed, foliaceous, sooner or later deciduous
Remarks: Two or more large glands on petiole at base, rarely higher than 6 meters

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: yellow, green or whitish
Scale hair: pubescent
Catkins, staminate
Length: 2-7 cm, stout
Width: 15 mm
Catkins, pistillate
Length: 2-12 cm
Capsules
Length: 4-7 mm
Other: glabrous
Styles: .5-1 mm
Stigmas: .5 mm, blunt
Stamens: 3-8
Remarks: Normally has 5 stamens, scales fall soon after bloom



Location not known



Salix lemmonii Bebb.
Lemmon Willow

General

Synonyms: *S. austinae* Bebb.
Other Common Names: —
Pronunciation: lem-mon- (emphasis, 'o' as in note) -e ('e' as in mete) -i ('i' as in pine)
Ecological Zone(s): Montane, Subalpine
Wetland status: facultative
Remarks: May not be in Montana, no map available, very like *S. geyeriana* and *S. drummondiana*, streambanks, relatively dry portion of riparian zone, higher elevation than *S. geyeriana*

Vegetative Structures

Habit: shrub
Height: 1-3 meters (3-10 ft.)
Twigs: glabrous to sparsely pubescent, becoming strongly glaucous, chestnut red to purplish red.
Mature leaves:
Dorsal: shiny green, very finely pubescent to glabrous
Ventral: pale glaucous, finely pubescent
Margin: Entire to serrulate
Length: 3-8 cm
Width: 6-15 mm
Shape: lance-elliptic
Stipules: minute, inconspicuous
Remarks: Leaves slightly appressed reddish hairy when unfolding, soon mostly glabrous; numerous slender, crooked stems; loose basal cluster

Sexual Structures

Catkins, general
Emergence time: precocious to coetaneous
Scale color: brown to black
Scale hair: long pubescent
Catkins, staminate
Length: 1—3.5 cm
Width: —
Catkins, pistillate
Length: 1-5 cm
Capsules:
Length: —
Other: pubescent
Styles: .2-.9 mm
Stigmas: less than 0.5 mm
Stamens: 2
Remarks: —



Salix lutea Nutt.
Yellow Willow

General

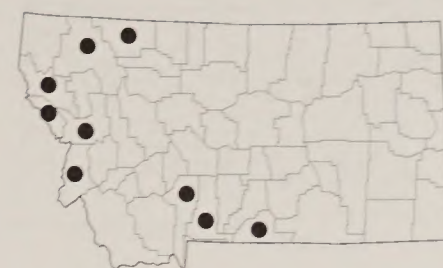
Synonyms:
Other common name(s): Mackenzie Willow
Reference(s): CP, ECI, CP, RDT, VPM, NW
Pronunciation: lu- (emphasis, 'u' as in mute) te- ('e' as in mete) a ('a' as in Persia)
Ecological Zone(s): Foothills/Valley, Plains
Wetland status: facultative
Remarks: Called *S. rigida* var. *watsonii* (Bebb) Cronq in NW; this is a misapplied name, *not* synonymy. (see Appendix C)

Vegetative Structures

Habit: medium to large shrub, small tree
Height: 3-8 meters (10-26 ft.)
Twigs: young are usually distinctly yellowish, older are silvery gray
Mature leaves:
Dorsal: glabrous, dark green to yellow green
Ventral: pale, usually glaucous
Margin: serrulate to entire
Length: 3-12 cm
Width: 10-40 mm
Shape: broadly elliptic to lanceolate to oblanceolate, acuminate
Stipules: well developed, foliaceous, sooner or later deciduous
Remarks: Bark yellowish gray

Sexual Structures

Catkins, general
Emergence time: coetaneous to precocious
Scale color: light brown to black to blackish red
Scale hair: pubescent
Catkins, staminate
Length: up to 5 cm
Width: —
Catkins, pistillate
Length: 2-8 cm
Capsules
Length: 4-7 mm
Other: glabrous, ovoid
Styles: .3-.7 mm
Stigmas: 2 lobed
Stamens: 2
Remarks: Flowers in April to early May



Salix melanopsis
(Mountain) Streambank Willow

General

Synonyms: —
Other common name(s): Sandbar Willow, Dusky Willow, Coyote Willow, Slender Willow
Reference(s): ECI, NW, VPM
Pronunciation: mel- ('e' as in mete) an-op- ('o' as in note) -sis (emphasis)
Ecological Zone(s): Montane
Wetland status: obligate
Remarks: Treated as a subspecies of *S. exigua* in ECI, much taxonomic confusion with *S. exigua*. The species overlap; both species form colonies, not clumps, this is unique. See appendix C.

Vegetative Structures

Habit: medium to large shrub
Height: 1.5-8 meters (5-25 ft.)
Twigs: glabrous, red or brown
Mature leaves:
Dorsal: green
Ventral: glaucous, glabrous
Margin: somewhat toothed
Length: 3-6 cm
Width: 5-15 mm
Shape: linear to elliptic
Stipules: minute to glabrous
Remarks: —

Sexual Structures

Catkins, general
Emergence time: serotinous to coetaneous
Scale color: yellowish
Scale hair: completely glabrous to pubescent at base
Catkins, staminate
Length: 1.5-6 cm
Width: —
Catkins, pistillate
Length: 1.5-8 cm
Capsules
Length: 4-8 mm
Other: glabrous, ovoid
Styles: .5-1 mm
Stigmas: bilobed
Stamens: 2
Remarks: Note glabrous pistil in the drawing—otherwise the drawing is the same as *S. exigua*



Salix monochroma Ball
One Colored Willow

General

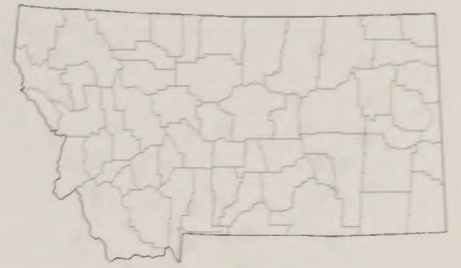
Synonyms:
Other common name(s):
MacKenzie Willow
Reference(s): NW, VPM
Pronunciation: mono- (emphasis)
chrom-a ('a' as in Persia)
Ecological Zone(s): Foothills/Valley
Wetland status: facultative
Remarks: Called *S. rigida* var.
mackenzieana (Hook) Cronq. in
NW. See Appendix C, Wet mead-
ows and streambanks, ditch banks.
See appendix C.

Vegetative Structures

Habit: Coarse shrub, medium to
large
Height: 1-9 meters (3-30 ft.)
Twigs: reddish-brown, not yellow
Mature leaves:
Dorsal: green, usually glabrous
Ventral: glaucous
Margin: finely toothed
Length: 5-15 cm
Width: 10-30 mm
Shape: lanceolate to elliptic,
acuminate
Stipules: to 10 mm, foliaceous,
inconspicuous on older branches
Remarks: Leaves thin, somewhat
translucent

Sexual Structures

Catkins, general
Emergence time: precocious to
coetaneous
Scale color: light brown to blackish
Scale hair: glabrous, axis wooly
Catkins, staminate
Length: up to 5 cm
Width: 10-15 mm
Catkins, pistillate
Length: 3-9 cm
Capsules
Length: 3-7 mm
Other: glabrous
Styles: .2-.7 mm
Stigmas: often scarcely bilobed
Stamens: 2
Remarks: —



Location not known



Salix petiolaris J.E. Sm.
Meadow Willow

General

Synonyms: —
Other common name(s): Basket Willow
Reference(s): CP, GP, VPM
Pronunciation: pet-e- ('e' as in mete) o- ('o' as note) la- (emphasis, 'a' as in fare) ris
Ecological Zone(s): Plains
Wetland status: facultative
Remarks: Reported in Montana, apparently not confirmed.

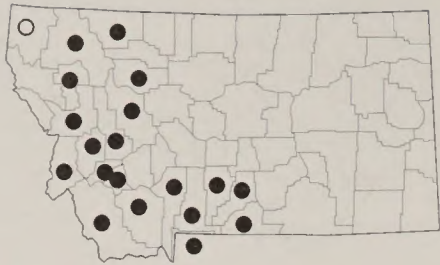
Vegetative Structures

Habit: clump to few stemmed tree, medium height
Height: 1-7 meters (3-23 ft.)
Twigs: slender, puberulent, yellowish to dark brown or reddish brown (glabrous)
Mature leaves:
Dorsal: pubescent becoming glabrous, dark green
Ventral: glaucous
Margin: usually sharply serrate, sometimes entire,
Length: 1.5-15 cm
Width: 8-30 mm
Shape: narrowly lanceolate to narrowly oblanceolate, acute to acuminate
Stipules: absent
Remarks: leaf hairs change with age

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: brown
Scale hair: villous
Catkins, staminate
Length: 1-5 cm
Width: 2-2.5 cm
Catkins, pistillate
Length: —
Capsules
Length: 5-7 mm
Other: pubescent, conic or lanceolate-rostrate
Styles: .1-.3 mm, entire or divided
Stigmas: —
Stamens: 2
Remarks: Flowers in May

Drawing courtesy of New York Botanical Garden.



Salix planifolia Pursh
Planeleafed Willow

General

Synonyms:

Other common name(s): Tealeaf Willow

Reference(s): ECI, GP, RDT, VPM, WM

Pronunciation: plan- (emphasis) i- ('i' as in pin) fol- ('o' as in note) ia ('i' as in pine, 'a' as in Persia)

Ecological Zone(s): var. *monica*-Alpine, Subalpine; var. *planifolia*-Subalpine, Montane

Wetland status: see below

Remarks: Var. *monica* (Bebb) Jeps. is a low shrub; obligate wetland; - Var. *planifolia* Pursh is a medium shrub to shrubby tree, facultative wetland; forms dense thickets; common in the Beartooths, misnamed *S. phylicifolia* L., this is a mistake
not synonymy.

Vegetative Structures

Habit: see general

Height: .4-1 meter (1-3 ft.) var. *monica*, 2-4 meters (6-13 ft.) var. *planifolia*

Twigs: shiny, purplish to red to chestnut, divaricate, puberulent to glabrous

Mature leaves:

Dorsal: initially pubescent, then glabrous, dark green and glossy

Ventral: glaucous

Margin: usually entire to serrate

Length: 3-8 cm

Width: 12-35 mm

Shape: elliptic to oblanceolate to lanceolate

Stipules: minute, deciduous

Remarks: Var. *monica* leaves often broader than those of Var. *planifolia*, leaves have evident, parallel veins

Sexual Structures

Catkins, general

Emergence time: precocious to coetaneous

Scale color: black

Scale hair: villous

Catkins, staminate

Length: 1-4 cm

Width: —

Catkins, pistillate

Length: 1.5-6 cm

Capsules:

Length: 4-8 mm

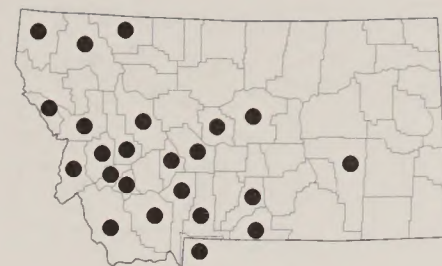
Other: pubescent, ovoid, beaked, long necked

Styles: .4-1.5 mm, entire

Stigmas: .3-.7 mm

Stamens: 2

Remarks: Flowers in May



Salix pseudomonticola Ball
Serviceberry Willow

General

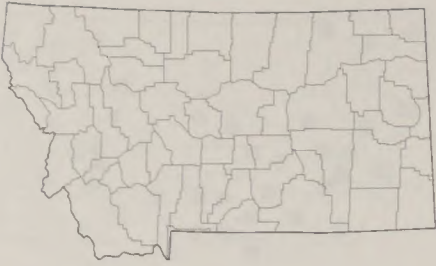
Synonyms: *S. monticola* Bebb.
Other common name(s): Mountain Willow, False Mountain Willow
Reference(s): CP, ECI, GP, NW, VPM, WM
Pronunciation: so- ('o' as in move) do- ('o' as in note) mon- (emphasis) tic- ('i' as in pin) ola ('o' as in note, 'a' as in Persia)
Ecological Zone(s): Subalpine, Montane
Wetland status: obligate
Remarks: Called *S. monticola* in NW, WM; along streams and in swamps, wet meadows, sometimes at canyon mouths. Hard to distinguish from *S. barclayi*.

Vegetative Structures

Habit: medium shrub
Height: 1.5-6 meters (5-20 ft.)
Twigs: pubescent to glabrous, yellowish to reddish, second year dark red
Mature leaves:
Dorsal: glabrous, dull green
Ventral: lighter than dorsal, glaucous
Margin: irregularly serrate to entire
Length: 3-8 cm
Width: 12-35 mm
Shape: ovate to obovate to elliptic
Stipules: persistent, ovate, 5-15 mm long
Remarks: Leaves red tipped when expanding, strongly veined, leaf midrib, petioles often red

Sexual Structures

Catkins, general
Emergence time: precocious
Scale color: dark brown to black
Scale hair: long villous
Catkins, staminate
Length: 2-7 cm
Width: —
Catkins, pistillate
Length: 1-9 cm
Capsules
Length: 5-8 mm
Other: glabrous, ovoid
Styles: .5-1.8 mm
Stigmas: —
Stamens: 2
Remarks: Flowers in May; catkins sessile



Introduced



Salix pendantra L.
Laurel Willow

General

Synonyms: —
Other Common Names: —
Pronunciation: Pen- (emphasis) den-
tra ('a' as in Persia)
Ecological Zone(s): Plains, Foot-
hills/Valley
Wetland Status: facultative
Remarks: Exotic, escapes not known

Vegetative Structures

Habit: tree
Height: to 20 mm (66 ft.)
Twigs: —
Mature leaves:
Dorsal: dark green, shiny
Ventral: pale
Margin: toothed
Length: 3.5-10 cm
Width: 15 to 40 mm
Shape: broadly lanceolate to ovate
Stipules: —
Remarks: —

Sexual Structures

Catkins, general
Emergence time: serotinous
Scale color:
Scale hair:
Catkins, staminate
Length: 2-5 cm
Width:
Catkins, pistillate
Length: 2-6 cm
Capsules
Length:
Other: glabrous
Styles: less than .8 mm
Stigmas: —
Stamens: 5
Remarks: Female catkins peduncled

Drawing courtesy of Robert Allen



Salix reticulata L.
Snow Willow

General

Synonyms: *S. nivalis* Hook.
Other common name(s): Creeping Willow
Reference(s): ECI, NW, VPM, WM
Pronunciation: re-tik-u- ('u' as in mute) la- (emphasis, 'a' as in fate) ta ('a' as in Persia)
Wetland status: facultative
Ecological Zone(s): Alpine
Remarks: Called *S. nivalis* in ECI, NW. Ours is ssp. *nivalis* (Hook) Love et al.

Vegetative Structures

Habit: low creeping shrub
Height: to 8 cm (3.5 in.)
Twigs: glabrous, sparsely hairy below catkins.
Mature leaves:
Dorsal: long silky hairs, soon deciduous, dark green
Ventral: pale glaucous
Margin: entire
Length: 1 to 3.5 cm
Width: 5 to 20 mm
Shape: elliptic to ovate to suborbicular
Stipules: minute, caducous
Remarks: Mat forming above treeline, leaves rounded, plants have rhizome-like stems

Sexual Structures

Catkins, general
Emergence time: coetaneous to serotinous
Scale color: pale green to yellow
Scale hair: glabrous to finely hairy
Catkins, staminate
Length: .4-2 cm
Width: very slender
Catkins, pistillate
Length: .5-2 cm
Capsules
Length: —
Other: pubescent, subsessile
Styles: .1-.2 mm
Stigmas: —
Stamens: 2
Remarks: —



Salix rotundifolia Trautv.
Dodge Willow

General

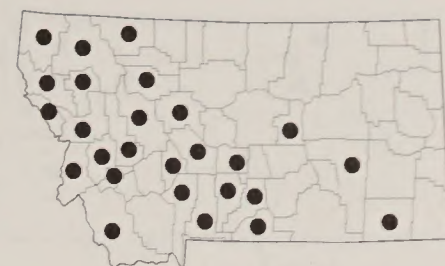
Synonyms: *S. dodgeana* Rydb.
Other common name(s): Creeping Willow
Reference(s): NW, VPM, WM
Pronunciation: ro- ('o' as in note) tun-di- ('i' as in pin) fol- (emphasis, 'o' as in note) li-us
Ecological Zone(s): Alpine
Wetland status: facultative
Remarks: Called *S. dodgiana* in NW, ours is called var. *dodgeana* (Rybd.) Argus. Found in moist alpine situations on limestone

Vegetative Structures

Habit: low creeping shrub
Height: to 8 cm (3.5 in.)
Twigs: —
Mature leaves:
Dorsal: glabrous, firm, glossy green
Ventral: same
Margin: entire, ciliate
Length: .3-.9 cm
Width: 2-5 mm
Shape: elliptic to oval to suborbicular
Stipules: —
Remarks: Mat forming above treeline, old leaves persist, leaves are very small and firm. Plant rhizomatous.

Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: purplish
Scale hair: mostly glabrous
Catkins, staminate
Length: very short
Width: usually have only 3-4 flowers
Catkins, pistillate
Length: very short, 2-9 flowers
Capsules
Length: 3.5-4.5 mm
Other: glabrous, ovoid
Styles: .2-.8 mm
Stigmas: bilobed, .5-1 mm
Stamens: 2
Remarks: —



scouleriana

Salix scouleriana Barr
Scouler Willow

General

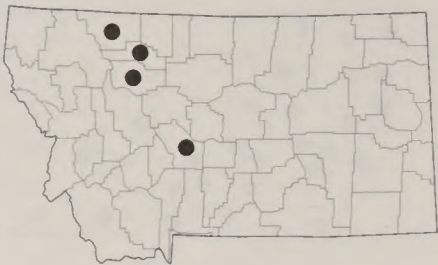
Synonyms: —
Other common name(s): Fire Willow
Reference(s): ECI, GP, NW, VPM, WM
Pronunciation: sco- ('o' as in note) ler-e- ('e' as in mete) ana ('a' as in fate, 'a' as in Persia)
Ecological Zone(s): Foothills/Valley, Montane
Wetland status: relatively dry sites
Remarks: Often found in cut over, burned over or avalanche areas

Vegetative Structures

Habit: usually a shrub, sometimes a medium tree
Height: 3-15 meters (10-50 ft.)
Twigs: pubescent (sometimes velvety) to glabrous, older yellowish to reddish brown
Mature leaves:
Dorsal: pubescent to glabrous, dull green
Ventral: glaucous, usually finely pubescent, veiny
Margin: crenate, serrate
Length: 2-9 cm
Width: 10-40 mm
Shape: oblanceolate to ovate to obovate
Stipules: variable shape, deciduous
Remarks: "Skunky" odor when bark from twigs of the previous year is stripped, often found in shade, leaves thickish.

Sexual Structures

Catkins, general
Emergence time: coetaneous or precocious
Scale color: blackish
Scale hair: long pubescent
Catkins, staminate
Length: 2-4 cm
Width: —
Catkins, pistillate
Length: —
Capsules
Length: 2.5-8 mm
Other: densely pubescent, beaked, ovoid
Styles: .4-.8 mm
Stigmas: bilobed, .5-1 mm
Stamens: 2
Remarks: Flowers in May



Salix serissima (Bailey) Fern.
Autumn Willow

General

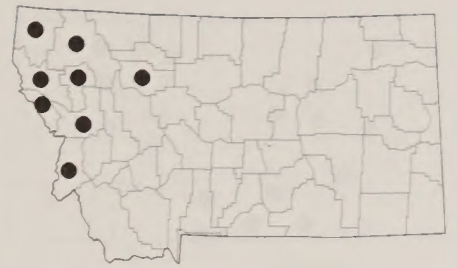
Synonyms: —
Other common name(s): —
Reference(s): GP
Pronunciation: ser- (emphasis) ris-
(‘i’ as in pin) im- (‘i’ as in pin) ma
(‘a’ as in Persia)
Ecological Zone(s): Foothills/Valley
Wetland status: facultative
Remarks: Considered sensitive in
MT by The Nature Conservancy,
extremely rare in MT, probably
secure globally. Swamps and
streams sites. Wet organic soils.

Vegetative Structures

Habit: medium shrub
Height: to 4 meters (to 13 ft.)
Twigs: yellowish-brown, glabrous,
shining
Mature leaves:
Dorsal: glabrous, shining yellowish
green to green
Ventral: pale
Margin: finely glandular-serrulate
Length: 4-10 cm
Width: 10-35 mm
Shape: elliptic to lanceolate to
oblong-lanceolate
Stipules: rarely present
Remarks: Bark silvery, branches
olive brown, plants rarely over 2
meters.

Sexual Structures

Catkins, general
Emergence time: serotinous,
appear in mid to late summer
Scale color: light yellow
Scale hair: pubescent
Catkins, staminate
Length: 1-4 cm
Width: —
Catkins, pistillate
Length: 1.5-3 cm
Width: to 20 mm
Capsules
Length: 7-12 mm
Other: glabrous, ovoid, olive
brown, cartilaginous
Styles: —
Stigmas: short, divided
Stamens: 3-5+
Remarks: Catkins unique in the fact
that they appear so late



Salix sitchensis Sanson
Sitka Willow

General

Synonyms: *S. coutleri* Andress.
Other Common Name(s): —
References: NW, VPM, WM
Pronunciation: sit- (emphasis) ka-
(‘a’ as in Persia) en-sis
Ecological Zone(s): Montane
Wetland status: facultative
Remarks: Along streams and in
moist woods, may hybridize with *S.*
drummondiana, especially when
male plants are absent.

Vegetative Structures

Habit: shrub
Height: 2-7 meters (6-23 ft.)
Twigs: velvety-puberulent to
velvety tomentose, yellowish brown
becoming grayish
Mature leaves:
Dorsal: sparsely gray pubescent to
glabrous, green
Ventral: silvery pubescent, less
green
Margin: entire, callous glands on
margin
Length: 4-9 cm
Width: 15-35 mm
Shape: obovate to oblanceolate to
elliptic to lanceolate
Stipules: small to caducous to well
developed, persistent
Remarks: Bark smooth, gray

Sexual Structures

Catkins, general
Emergence time: precocious to
coetaneous
Scale color: light brown to blackish
Scale hair: long pubescent
Catkins, staminate
Length: 2.5-5 cm
Width: —
Catkins, pistillate
Length: 3-9 cm
Capsules:
Length: densely pubescent
Other: —
Styles: .3-.8 mm
Stigmas: .2-.3
Stamens: 1
Remarks: Single stamen is unique,
formed by the fusion of two stamens



Salix tweedyi Bebb. ex. Rose) Ball
Tweedy Willow

General

Synonyms: *S. barratiana* Hook var. *tweedyi* (Bebb.)
Other common name(s): —
Reference(s): ECI, NW
Pronunciation: tweed- (emphasis) e- ('e' as in mete) i ('i' as in pie)
Ecological Zone(s):
Wetland status: facultative
Remarks: —

Vegetative Structures

Habit: large shrub
Height: to 4.5 meters (15 ft.)
Twigs: stout, long spreading pubescent
Mature leaves:
Dorsal: long, spreading pubescent to glabrate
Ventral: essentially glabrous, slightly paler than dorsal, not glaucous
Margin: finely glandular serrulate to subentire
Length: 4-9 cm
Width: 20-50 mm
Shape: elliptic to elliptic-ovate to obovate
Stipules: well developed, foliaceous, 5-12 mm
Remarks: —

Sexual Structures

Catkins, general
Emergence time: precocious to coetaneous
Scale color: blackish
Scale hair: long pilose
Catkins, staminate
Length: 2-4 cm
Width: 15-20 mm
Catkins, pistillate
Length: 2-8 cm
Capsules
Length: 4.5-7 mm
Other: usually glabrous
Styles: 1-3 mm
Stigmas: —
Stamens: 2
Remarks: —



Salix vestita Pursh
Rock Willow

General

Synonyms: —
Other common name(s): —
Reference(s): NW, VPM, WM
Pronunciation: ves-te- (emphasis, 'e' as in mete) ta ('a' as in Persia)
Ecological Zone(s): —
Wetland status: facultative
Remarks: Moist stoney soil or moist rock outcrops, may be more common on wet organic soil

Vegetative Structures

Habit: medium to large shrub
Height: 1-10 meters (3-34 ft.)
Twigs: pubescent
Mature leaves:
Dorsal: soon glabrous, dark green
Ventral: glaucous, silvery villous becoming glabrous
Margin: slightly revolute, very small gland teeth
Length: 2-9 cm
Width: 10-50 mm
Shape: elliptic-obovate to elliptic-ovate to suborbicular
Stipules: absent
Remarks: Leaf hair changes with age, plant can be distinguished by its leathery leaves with distinct venation

Sexual Structures

Catkins, general
Emergence time: serotinous
Scale color: brown
Scale hair: villous
Catkins, staminate
Length: 1.5-3 cm
Width: 5 mm
Catkins, pistillate
Length: 1-5 cm
Capsules
Length: 2-5 mm
Other: villous, ovoid
Styles: short or lacking
Stigmas: bilobed
Stamens: 2
Remarks: —



Salix wolfii Bebb
Wolf Willow

General

Synonyms: —
Other common name(s): —
Reference(s): ECI, VPM, WM
Pronunciation: wolf- (emphasis) e
(‘e’ as in mete) i (‘i’ s in pine)
Ecological Zone(s): Subalpine,
Montane
Wetland status: facultative
Remarks: Swamps, wet meadows,
bogs, occasionally along streams.
Wet organic soils. Var. *idahoensis*
Ball is common; var. *wolfii* is
considered sensitive by The Nature
Conservancy, extremely rare in MT,
apparently globally secure.

Vegetative Structures

Habit: medium to small shrub
Height: .6-2 meters (2-7 ft.)
Twigs: first year-thinly villous,
puberulent
Mature leaves:
Dorsal: silvery-pubescent, gray
green
Ventral: same
Margin: entire
Length: 2-6 cm
Width: 7-20 mm
Shape: elliptic to ovate to oblan-
ceolate
Stipules: foliaceous, 1-7 mm, sooner
or later deciduous
Remarks: 6+ feet high only when
not grazed, leaf veins inconspicuous

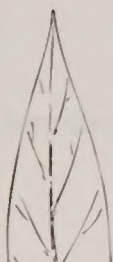
Sexual Structures

Catkins, general
Emergence time: coetaneous
Scale color: dark brown to blackish
Scale hair: wooly villous
Catkins, staminate
Length: .8-2 cm
Width: less than 10 mm
Catkins, pistillate
Length: .8-4 cm
Capsules
Length: 3.5-5 mm
Other: var. *idahoensis* villous; var
wolfii, glabrous
Styles: .5-1.1 mm
Stigmas: bilobed
Stamens: 2
Remarks: —

Drawing courtesy of New York Botanical Garden. Map courtesy of Steve Chadde, Lesica and Shelly (1991)

A Glossary Designed Especially for Use in Willow (Salix) Identification

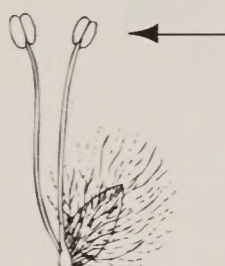
Acuminate - Refers to a kind of leaf tip:
long, gradually tapering to a sharp point.



Acute - Refers to a kind of leaf tip: ending quickly in a sharp point.



Ament - Syn. catkin; cluster of unisexual flowers; dense, elongate.



Anther - Pollen bearing sac, mounted on a filament.

Appressed - Lying close to and flattened to the surface.

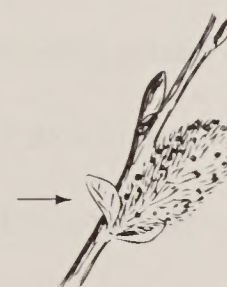
Axis - Main longitudinal (right angle to horizontal) support structure in a catkin from which flowers arise.

Bicarpellate - Having two carpels.



Bilobed - Two lobed, cleft.

Bract - Modified, reduced leaf; located just above a catkin on a branchlet. Not to be confused with scales (floral bracts) which are part of the catkin. Some works refer to scales as bracts.



Caducous - Falling off early in the yearly development of a plant.

Callous, Callus - Tissue that forms over a cut or damaged plant surface.

Calyx - The outer group of floral leaves (petals).

Capsule - A dry fruit; opening by slits or valves, has more than one seed bearing unit.

Carpel - Ovule bearing part of a pistil.

Cartilaginous - Resembling the consistency of cartilage.

Catkin - Syn. ament (see above).



Ciliate - Refers to leaf edge: fringed with hairs.

Coetaneous - Refers to catkins: appear at the same or about the same time as the leaves open.

Conic - Cone shaped.

Crenate - Refers to a leaf margin: toothed, shallow rounded teeth, "scalloped."

Deciduous - Falling off after completion of its function.

Divaricate - Widely divergent, forked.

Dorsal - The top side (of a leaf) under normal field circumstances.

Elliptic - Refers to leaf, etc., shape: widest in the middle, tapering equally to both ends (which are often rounded); shaped like an ellipse.

Entire - Refers to the edge of a leaf, etc.: without teeth or glands, completely smooth.

Facultative - Optional, not absolutely required.

Filament - Thread like stalk which supports the anther.

Foliaceous - Leaf like.

Floral Bract - See scale.

Glabrous - Without glands or hairs, not pubescent.

Glabrate - Nearly glabrous or becoming glabrous.

Glacous - Covered with a whitish, waxy layer which rubs off easily.

Glutinous - Having a sticky or slimy surface.

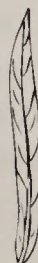
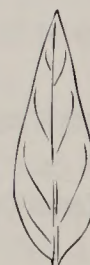
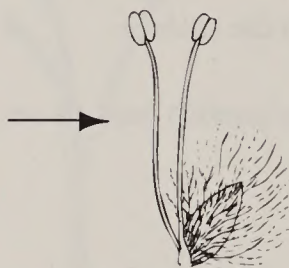
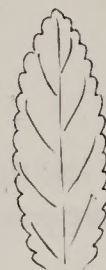
Hydric - Refers to soil: has an abundant supply of water.

Krumholtz - A growth form found in alpine situations (above the timberline). Trees that would normally be straight and tall that are stunted, shrubby, and low, often 1 meter or less high.

Lanceolate - Refers to leaf shape: spear (lance) shaped with the widest part near the base.

Locally Common - Found only in certain places (locales), but common when found.

Linear - Refers to leaf, etc., shape; long and narrow with parallel edges.



Mesic - Refers to soil: moist, but water is not abundant (not hydric).

Oblanceolate - Refers to leaf shape: spear shaped with the widest part near the tip.



Obligate - Required.

Obovate - Refers to the leaf shape: egg shaped with the narrow part near the base.



Obsolete - Wearing out or disappearing, i.e., a calyx united with the ovary or reduced to a rim.

Ovary - The part of the pistil that becomes the fruit. →



Ovate - Refers to leaf shape: egg shaped with wider part near the base.

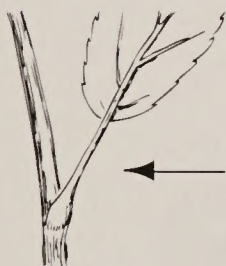


Ovoid - Refers to capsule: egg shaped with wider part near base.

Peduncle - A stem or stalk which supports the flower or fruit.

Pendulous - Hanging down.

Petiole - Leaf stalk.



Phreatophytic - Possessing deep roots which take water from the water table.

Pilous - Covered with soft, distinct, thin hairs.

Pistil - Female part of a flower, differentiated into ovary, style, and stigma.



Pistillate - Refers to female catkins; catkins that have female parts.



Precocious - Refers to catkins: appearing before the leaves open.

Pruinose - Having a waxy, powdery secretion on the surface; purplish bloom, "blue-stem willows."

Puberulent - Having tiny, barely visible hairs.

Pubescent - Having any kind of hair: i.e., pilous, puberulent, tomentose, villous, etc.

Pyric Disclimax - Disclimax resulting from repeated fire, fire disturbance climax, stage in plant succession replacing or modifying true climax because of fire.

Reticulate - Refers to leaf venation: like a network, has many interconnections.

Revolute - Refers to leaf margins: rolled toward the ventral side.

Rostrate - Beaked.

Rugous - Wrinkled.

Scale - Syn. floral bract. A nongreen bract associated with each flower of a catkin.
Some works refer to scales as bracts.



Sericeous - With many long, straight, soft appressed hairs giving a silky appearance.

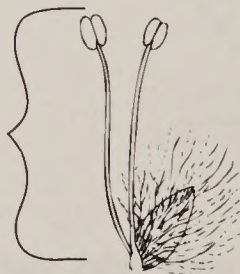
Serotinous - Refers to catkins: appearing after the leaves.

Serrate - Refers to leaf edge; finely toothed.



Sessile - Sitting directly on base without a supporting stalk, petiole, or peduncle.

Stamen - Male part of a flower, divided into the anther and a filament.



Staminate - Refers to catkins: catkins that have male parts.



Stigma - The top part of the pistil. Receives the pollen.



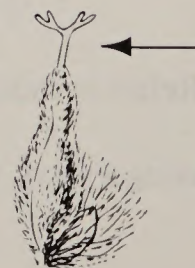
Stipe - Syn. peduncle; the stalk that bears the pistil or fruit.



Stipule - A paired appendage found at the base of a petiole.

Style - The part of the pistil which separates the stigma from the ovary. Usually elongated.

Superior - Refers to ovary; ovary placed above the sepals.



Synonymy - Replaced by another name.

Timberline - Transition zone from forest to alpine meadows and/or rockland.

Tomentose - Covered with tangled, matted, wooly hairs.

Twig of the year (season).

Twig of the previous year.

Twig in its third season of growth.

Ventral - The bottomside (of a leaf) under normal field conditions.

Villous (Villose) - Having long, soft hairs that are not matted.



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APPENDIX A

Index of Preferred Common Names

Alpine Willow - *S. arctica*
Autumn Willow - *S. serissima*
Barclay Willow - *S. barclayi*
Barrett Willow - *S. barrattiana*
Bebb Willow - *S. bebbiana*
Booth Willow - *S. boothii*
Cascade Willow - *S. cascadiensis*
Crack Willow - *S. fragilis*
Dodge Willow - *S. rotundifolia*
Drummond Willow - *S. drummondiana*
Eastwood Willow - *S. eastwoodiae*
Farr Willow - *S. farriae*
Geyer Willow - *S. geyeriana*
Gray Willow - *S. glauca*
Hoary Willow - *S. candida*
Laurel Willow - *S. pendantra*
Lemmon Willow - *S. lemmonii*
Meadow Willow - *S. petiolaris*
Mountain Streambank Willow - *S. melanopsis*
One Colored Willow - *S. monochroma*
Pacific Willow - *S. lasiandra*
Peachleaf Willow - *S. amygdaloides*
Plane Leafed Willow - *S. planifolia*
Pussy Willow - *S. discolor*
Rock willow - *S. vestita*
Sculer Willow - *S. scouleriana*
Serviceberry Willow - *S. pseudomonticola*
Sitka Willow - *S. sitchensis*
Short Fruited Willow - *S. brachycarpa*
Snow Willow - *S. reticulata*
Streambank Willow - *S. exigua*
Tweedy Willow - *S. tweedyi*
Undergreen Willow - *S. commutata*
Yellow Willow - *S. lutea*
Weeping Willow - *S. babylonica*
White Willow - *S. alba*
Wolf Willow - *S. wolfii*

APPENDIX B

Range Maps

The maps were prepared independently by Steve Chadde, USDA, Forest Service (RAWE), Missoula, Montana, and Robert Dorn, Mountain West Environmental Services, Cheyenne, Wyoming. Between the two sources, we were able to get maps for most willow species in Montana. Lesica and Shelley (1991) provided information that enabled us to make maps for the species considered sensitive by The Nature Conservancy (Barrat Willow, Cascade Willow, Autumn Willow, and a variety of Wolf Willow). Therefore, we have maps for all species except for exotic species and those that we are not completely certain are in Montana—Lemmon Willow and Meadow Willow.

We have not included maps for the exotic species—White Willow, Weeping Willow, Laurel Willow, and Crack Willow because they may have been planted anywhere there is or was human habitation. Maps would have told little of their tolerances and where they might be encountered in the wild.

Species which have been verified in or reliably reported in a given county are denoted by a solid black disk in that county on the map. An unverified report is denoted by an open circle. Wolf Willow, variety *idahoensis*, the common taxon, is denoted by a disk.

APPENDIX C

Ongoing Taxonomic Work With the Genus *Salix*

Diamond or Missouri Willow (*S. eriocephala* Michx.), Yellow Willow (*S. lutea* Nutt.), One Colored Willow (*S. monochroma* Ball), Mackenzie Willow (*S. rigida* var. *mackenzieana* (Hook) Cronq.), *S. mackenzieana* (authority unknown), *S. proluxa* (authority unknown), and other taxa are very similar and have caused considerable confusion. Robert Dorn is presently working with the group but is not yet completed. He feels that they may all be a single species, and if so, all taxons of the group must be called *S. eriocephala* (the oldest name).

Streambank Willow (*S. exigua*) and Mountain Streambank Willow (*S. melanopsis*) have also caused problems. The two species overlap and may hybridize. Steven Burnsfeld is working on this group.

For the sake of consistency, we will continue to use the species that Dr. Dorn has in his two excellent publications, Vascular Plants of Montana (1984), and Vascular Plants of Wyoming (1988). These are: Yellow Willow (*S. lutea*) and One Colored Willow (*S. monochroma*) for the *S. eriocephala* group, and Streambank Willow (*S. exigua*) and Mountain Streambank Willow (*S. melanopsis*) for Dr. Brunsfeld's group.

If these people complete their work by the time our final technical bulletin comes out, we will probably adopt their products.

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